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NetWare Version 2.2

Quick Access Guide

NetWare®

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CONVENTIONS

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The Conventions section describes the intended audience for this guide and explains the assumptions we have made about you and your network.

The section introduces specialized terms used throughout the guide and explains how to enter, exit, and move around in NetWare menu utilities.

The format for entering NetWare commands and instructions for changing directories and for marking several directories or files to work with simultaneously are also explained.

References (page numbers in parentheses) throughout the guide refer you to these explanations as they are needed.

■ ABOUT THIS GUIDE

Who should use this guide. This guide has been prepared for system administrators, workgroup managers, and others who need quick access to basic procedures.

What is included. Only primary or frequently used tasks are documented. In most cases, examples and options are representative, not all-inclusive. Complete information about each task can be found in one or more manuals in the v2.2 manual set. Refer to the Master Index in the back of the other manuals to locate the information you need.

Page references (enclosed in parentheses) refer to complementary or additional information within this guide.

How the guide is organized. Tasks have been grouped and tabbed by subject. Use the index beginning on page 146 and the tables of contents at the beginning of each tabbed section to help you locate the information you need.

Assumptions. This guide makes several assumptions:

- Your network has been installed and is functional. Users, directories, printing, etc., have been set up, but you need to enhance or modify the setup.
- You have supervisor-equivalent rights (page 71) even though many tasks can be performed by any user.
- Network workstations use DOS. If this is not the case on your network, use the DOS examples to suggest ways you might use other operating systems in conjunction with NetWare.
- All commands are entered at the workstation command line unless otherwise noted.
- You are already logged in to the file server (see page 122) whose files or setup you are accessing or modifying.

■ NETWARE CONVENTIONS

Words with specialized meaning. Refer to the chart below.

Highlight	Use the Arrow keys to move the highlight bar to the item you want to select.
Mark	Highlight an item and press <F5>. Marking several items lets you work with all of them at once. Press <F5> again to deselect a marked item.
Select	Highlight or mark one or more items and press <Enter>.
<Enter>	Press the "Enter" (Return) key.
<Esc>	Press the "Escape" key. NetWare menu utilities sometimes use <Esc> as an alternate way to save changes.

Access menu utilities. Type the utility name (SYSCON, FILER) at the command line. MenuPaths like the following indicate which options to select to reach a desired list, form, or submenu.

SYSCON → User Information → User Names

In this case, type *SYSCON* at the command line, select *User Information* from the menu that appears, and then select a user from the *User Names* list.

Exit menu utilities. Use either of the following methods:

- Press <Esc> repeatedly until the *Exit* prompt appears. Confirm or cancel your changes.
- Press <Alt-F10>. Changes will not be saved unless you first press <Esc> and answer Yes to the confirmation prompt.

Get help. Press <F1>. Exit help by pressing <Esc>.

Determine function key assignments. Press <F1> twice.

Move around in menus. Refer to the chart below.

To move to	Press
Top of a list	<Ctrl-PgUp>
Bottom of a list	<Ctrl-PgDn>
Opposite column	Left or Right Arrow
Items above or below the screen display	Up or Down Arrow

Interpret NetWare commands. In general, NetWare and DOS commands follow the same conventions. The list in the next column explains the sample command below:

REMOVE [USER | GROUP] ***name*** **[[FROM]** ***path*****] [*****option*****...]**

Uppercase keywords	Indicate words that must be spelled as shown. Use either upper- or lowercase.
Italics	Indicate variable information. Replace with information specific to your task.
Square brackets [ ]	Enclose optional parts of the command. Don't type the brackets.
Nested square brackets [[ ]]	Enclose options within options. Include outside option if you include nested option.
Ellipses . . .	Indicate that more than one option can be used with the command.
Angle brackets < >	Enclose keynames. Press the key. Don't type the brackets.
Vertical bar |	Separates either/or options.
Other characters	Type as shown in examples.

■ CHANGE DIRECTORIES

To execute many NetWare commands, you must make the directory you are working with your "current" (or default) directory. In other cases, you may need to specify a source, destination, or working directory. You can select directories from inside most menu utilities or at the command line.

With menu options

Most NetWare menu utilities provide an option for selecting a "Current Directory." When you select the option, a box containing the current directory path appears. Use either of the methods explained in the FILER examples below to supply a new path.

Modify the current directory path

1. Select *FILER → Select Current Directory.* A window listing the current directory path appears.
2. Delete the portion of the path that needs to be changed.
3. Type the new path.
4. When the new or modified path is complete, press <Enter> to return to the FILER menu.

Use the Insert method

1. Select *FILER → Select Current Directory.* A window listing the current directory path appears.
2. Delete the portion of the path that needs to be changed.
3. Press <Ins> to list the directories immediately below the last directory in the path.

✓ *Select ".." to move to the parent of the current directory.*

4. Select the appropriate directory. The directory is added to the path and any subdirectories on the next level appear in the list.
5. Repeat Step 4 to add additional directories or files to the path.
6. Press <Esc> to exit the Insert box. When the new or modified path is complete, press <Enter> to return to the FILER menu.

With DOS commands

Change to the needed directory at the command line using DOS's CD commands. Some of the DOS commands below function only in combination with NetWare.

To move to	Type
Subdirectories	CD *Directory\Subdirectory*
Root directory	CD \
One level back	CD ..
Two levels back	CD ...
A parallel directory	CD ..*Directory*
A different volume	CD *Volume* :

■ SELECT SEVERAL OPTIONS AT ONCE

NetWare often allows you to work with several options simultaneously as in the FILER examples below.

With the Mark key

1. Select *FILER → Directory Contents*. A window listing the files and subdirectories in the current directory appears.
2. Highlight each directory or file in turn and press <F5> (Mark).
3. Press <Enter> to select the group of marked items.

With Mark patterns

1. Select *FILER → Directory Contents* and press <F6>.
2. Enter a pattern to be matched. For example, to select directories that have a .BAK extension, type **.BAK** in the *Mark Pattern* box.

✓ *Patterns can include the wildcard characters* **?** *and* *****. *(See p 8.)*

3. Press <Enter> to select the group.

■ FILENAME CONVENTIONS

NetWare filenames have three components:

Volume	14 characters maximum; terminated by a colon.
Directories	14 characters maximum; separated from following file or directory by a backslash.
File	8-character maximum; can be extended by adding a period and up to 3 characters.

Example: **Accounts:Payable\Dec\1990.pd**

✓ *The following characters can't be used in filenames: (\), (/), (?), (*), (,), (;), and (:).*

Filenames are also referred to as directory paths. You can replace *Path*, *FileName*, and other path variables in several ways.

For example, assume that drive F is mapped (p 34) to ACCOUNTS\PAYABLE. Directories under PAYABLE could be listed by specifying the following:

- A complete path to the directory or file (to DEC in this example). Type

  DIR F: \Accounts:Payable\Dec

- A relative path (the portion of the path below the directory a drive is mapped to DEC in this example). Type

  DIR F: DEC

- A drive letter. Type

  DIR F:

- No path if you are listing files in the current directory. Type

  DIR

■ WILDCARD CONVENTIONS

NetWare supports the following wildcard characters (universal replacements for a character or character set):

?	Matches any single character
*	Matches a character set; comparable to DOS *.*

Wildcards search for groups of volumes, directories, or files as in these examples:

NCOPY *.EXE	Copies all files containing an .EXE extension
DIR *.?	Lists all files having a single-character extension or no extension

USERS AND GROUPS
10

Users and Groups

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A mail directory and a file server account that allows users to log in and gain access to network files and printers is automatically created for each user and group you create.

Users are automatically assigned to the group EVERYONE and have the rights assigned to that group. You can create as many additional groups (or delete EVERYONE) as you want.

If you intend to set account restrictions that will apply to all users (p 11), set restrictions before creating the users.

When you delete users or groups, run BINDFIX to remove their mail directories and passwords. You must also delete trustee assignments (p 64) and directories (p 22) created specifically for those users.

■ ASSIGN ACCOUNT RESTRICTIONS (system-wide)

NetWare allows you to control user accounts by assigning system-wide restrictions that apply to users created after the restrictions are set or by assigning restrictions to an individual user (p 14). It is usually more efficient to specify system-wide restrictions and then make changes for individual users in exceptional cases. Individual restrictions override system-wide restrictions.

1. Access *SYSCON → Supervisor Options → Default Account/ Balance Restrictions*. A form appears.
2. Change the form as necessary. (Press <F1> for a description of items on the form.)
   - — Yes/No options. Highlight the option and type Y or N. Press <Enter>.
   - — Other options. Highlight a field and delete, add to, or overwrite the information. Press <Enter>.

Set account expiration date. Type Y and accept (press <Enter>) or overwrite the date that appears.

Limit the number of workstations users can log in from. Unless you specify otherwise, a user can log in from any workstation. To limit concurrent connections, type Y and then the desired number.

Create home directory for user. If this option is set to Y, you are prompted to create home directories when you create users (p 14).

Set password restrictions. If you require passwords, you can

- Specify password length (the minimum number of characters).
- Specify whether users must change their passwords periodically and, if so, the number of days between forced changes.
- Specify whether users can log in with an expired password.
- Specify whether passwords must be unique (not used recently).

Set credit limits. If you will activate accounting on the server, type in values for *Account Balance*, *Allow Unlimited Credit*, and *Low Balance Limit*. See "Managing Accounting" in *Using the Network*.

Limit disk space. This option is available only if the disk space limitation parameter has been set. See "Limit Disk Space" (p 123).

■ ASSIGN TIME RESTRICTIONS (system-wide)

✓ *System-wide restrictions must be set before creating users.*

1. Access *SYSCON → Supervisor Options → Default Time Restrictions*. The following form appears.

Default Time Restrictions

AM PM

1 1 1 1 1
2 1 2 3 4 5 6 7 8 9 0 1 2 1 2 3 4 5 6 7 8 9 0 1

Sunday	
Monday	* * * * * * * * * * * *
Tuesday	* * * * * * * * * * * *
Wednesday	* * * * * * * * * * * *
Thursday	* * * * * * * * * * * *
Friday	* * * * * * * * * * * *
Saturday	

Monday To Friday 8:00 am To 7:00 pm

2. Each asterisk indicates a half-hour segment during which a user can log in. Modify the form as necessary.
   - — Clear the form of previous settings. Position the cursor at the top left asterisk. Press <F5> and then press <End-Page-Down-Delete>.
   - — Delete time segments. Position the cursor at the beginning of the time segment to be deleted. Press <F5>, block the segment, and press <Delete>. To delete all segments after a particular time, position the cursor at the beginning of the segment; press <F5> and then <End-PageDown-Delete>.
   - — Add time segments. Position the cursor at the beginning of the time segment being added. Press <F5>, block the segment, and press <Insert> or the Asterisk (*) key.

✓ *The time segment you select is indicated at the lower right hand corner of the screen.*

3. Press <Esc> to save the changes and exit the form.

■ ASSIGN TIME RESTRICTIONS (to individuals)

✓ *Individual restrictions override system settings.*

1. Access *SYSCON* → *User Information.*
2. Select or mark one or more users.
3. Select *Time Restrictions.* Modify the form as necessary. (Asterisks indicate half-hour segments during which a user can log in.)
   - — Clear the form of previous settings. Position the cursor at the top left asterisk. Press <F5> and then press <End-PageDown-Delete>.
   - — Delete time segments. Position the cursor at the beginning of the time segment to be deleted. Press <F5>, block the segment, and press <Delete>. To delete all segments after a particular time, position the cursor at the beginning of the segment; press <F5> and then <End-PageDown-Delete>.
   - — Add time segments. Position the cursor at the beginning of the time segment being added. Press <F5>, block the segment, and press <Insert> or the Asterisk (*) key.
4. Press <Esc> to save the changes and exit the form.

■ ASSIGN STATION RESTRICTIONS (to individuals)

1. Determine the network and node addresses for the workstations the user will be assigned to. (Log in to the workstations in question and type **USERLIST /A** at the command line.)
2. Access *SYSCON* → *User Information* and then select a user.
3. Select *Station Restrictions* to display a list of *Allowed Login Addresses.* If the list is blank, the user can log in from any station.
4. Do one of the following.
   - — Add addresses. Press <Ins>, type the appropriate network address, and press <Enter>. Specify whether the user can log in from all workstations (nodes) on the network. If not, select No and then type one of the node address the user will be assigned to. Repeat this step to add other addresses.
   - — Delete addresses. Highlight or mark the stations to be deleted and press <Del>. Confirm the deletion.
5. Press <Esc> to save the changes and exit.

■ CREATE OR DELETE USERS

If you are creating large numbers of users, refer to the documentation for MAKEUSER or USERDEF in *Using the Network*.

Create users

✓ *If you intend to set up system-wide account and time restrictions (p 11and p 12), do so before creating users.*

1. Access *SYSCON → User Information*. A list of current users appears.
2. Press <Ins>, type the name of the new user, and then press <Enter>.

   If you have not changed the default system restrictions (p 11), an entry box appears indicating a path to a home directory NetWare creates for the user.
3. Do one of the following:
   - — Create the directory as indicated. Press <Enter> and confirm the selection.
   - — Create the directory, but change the path. Modify the directory path (p 6), press <Enter>, and confirm your selection
   - — Abort directory creation. Press <Esc>.
4. Press <Enter> to access the *User Information* menu.

   Some options on this menu are explained in other sections of this manual.

Intruder Lockout Status	(p 74)
User Login Scripts	(p 54)
Managers and Operators	(p 18)
Security Equivalences	(p 71)
Station Restrictions	(p 13)
Time Restrictions	(p 13)
Trustee Assignments	(p 64)
5. Select *Account Restrictions* to make exceptions to system-wide account restrictions (p 11) for individual users. Change the form as desired. (Press <F1> for a description of items on the form.)
   - — Yes/No options. Highlight the option and type Y or N. Press <Enter>.
   - — Other options. Highlight the field and delete, add to, or overwrite the information. Press <Enter>.

Account disabled. Type Y or N.

Account has expiration date. Type Y or N. If Y, type an expiration date.

Limit concurrent connections. Type Y or N. If Y, type the desired number.

Allow user to change password. If you require passwords, you can specify

- Password length (the minimum number of characters).
- Whether users must change their passwords periodically and, if so, the number of days between forced changes.
- Whether users can log in with an expired password (grace login).
- Whether passwords must be unique (not used recently).

Limit disk space. This option is available only if the disk space limitation parameter has been set. See "Limit Disk Space" (p 123).

Select the following options, as necessary (press <F1> for a description of options).

Select	To
Change Password	Specify a new password
Full Name	Specify user's full name
Groups Belonged To	List groups, add user to or delete user from groups (p 17)
Managed Users And Groups	View, add, or delete the users who will be managed by this user.
Managers	View, add, or delete the managers of this user (p 18)
Other Information	List last login, whether user is a console operator (p 18), disk space assigned and being used, and bindery ID
Trustee Directory Assignments	View, add, or delete directo ry trustees (p. 64); modify trustee assignments (p 66)

Delete users

1. Access *SYSCON → User Information*. A list of current users appears.
2. Select or mark the users to be deleted.

■ CREATE OR DELETE GROUPS

Create groups

If you intend to set up system-wide account (p 11) and time (p 12) restrictions that will affect members of groups, do so before creating the users. Account and time restrictions can't be set for groups.

✓ *Users can belong to as many as 32 groups.*

1. Access *SYSCON* → *Group Information*. A list of current groups appears.
2. Press <Ins> and type the name of the group being created. Press <Enter> to add the group to the list.
3. Press <Enter> again to access the *Group Information* menu.
4. Select the options you need to set up the group environment (press <F1> for a description of each option):

Select	To
Full Name	Describe the group
Managed Users And Groups	View, add, or delete the users who will be managed by this group
Managers	View, add, or delete the managers of this group (p 18)
Member List	View, add, or delete group members (p 17)
Other Information	Determine bindery ID and whether group members are console operators (p 18)
Trustee Directory Assignments	View, add, or delete directory trustees (p 64); modify trustee assignments (p 66)

Delete groups

Access *SYSCON* → *Group Information*. Select (or mark) the groups to be deleted. Press <Del> and confirm the deletion.

■ VIEW, ADD, OR DELETE GROUP MEMBERS

✓ *Groups must be created before you can add members to them (see p 16).*

View the members of a group

1. Access *SYSCON* → *Group Information*. Select the appropriate group.
2. Select *Member List* to display the current members of the group.

Add group members

3. Press <Ins> to list users who do not belong to the group.
4. Select (or mark) the users to be added.

Delete group members

3. Highlight (or mark) the members to be deleted.
4. Press <Del> and confirm the deletion.

■ ASSIGN OR DELETE MANAGERS AND OPERATORS

Assign or delete workgroup managers

Workgroup managers can create and delete users or groups and manager their accounts. They are usually assigned **A**ccess control rights (p 66) in the directories they supervise so that they can assign trustees.

1. *Access SYSCON → Supervisor Options → Workgroup Managers.*
2. Do one of the following:
   — Assign workgroup managers**.** Press <Ins> and select (or mark) the users or groups you want to assign workgroup manager status to.
   — Delete workgroup managers**.** Highlight (or mark) the users or groups to be deleted, press <Del>, and confirm the deletion.
3. Follow the instructions under the next heading to specify which users will be managed by a particular manager.

Assign account managers

Account managers can modify the accounts of those users they manage; they can't create or delete new user or group accounts.

1. Access *SYSCON* and select one of the following:
   • *User Information*
   • *Group Information*
2. Select the user or group who will be the account or workgroup manager.
3. Select *Managed Users and Groups.*
4. Press <Ins> and select (or mark) the users or groups to be assigned to this manager.

Assign or delete console operators

Console operators can perform FCONSOLE tasks normally reserved for the supervisor.

1. Access *SYSCON → Supervisor Options → File Server Console Operators.*
2. Do one of the following:
   — Assign operators**.** Press <Insert> and select (or mark) the appropriate users or groups.
   — Delete operators. Highlight (or mark) the operators to be deleted; press <Del> and confirm the deletion.

DIRECTORIES AND FILES
20

Directories and files

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■ CREATE DIRECTORIES

Directories can be created either with FILER or with DOS's MD command.

✓ *In addition to creating a directory, you may also want to do the following:*

- *Limit access to the directory by changing the Maximum Rights Mask (p 70).*
- *Assign users trustee rights (p 66).*
- *Assign file or directory attributes (p 68).*

With MD (DOS)

Consider the following example. Refer to the DOS manual for complete instructions.

1. Change to the directory you want to create subdirectories in (p 6).
2. Type **MD *Subdirectory***, replacing ***Subdirectory*** with the name of the new directory. Press <Enter>.

With FILER

1. Access *FILER → Directory Contents*.
2. Press <F2> and type or insert (p 6) the directory you are creating subdirectories for. Press <Enter>.
3. Press <Ins> and type the name of the new subdirectory. Press <Enter>. The name is added to the *Directory Contents* list.
4. To change default attributes (p 68), rights (p 70), and trustee assignments (p 66), select the directory and then select *View/Set Directory Information*. Change the *Directory Information* form as necessary.

■ RENAME DIRECTORIES AND FILES

Rename files with REN (DOS)

At the command line, type **REN *OldFilePath NewFileName*** and press <Enter>.

Rename directories with RENDIR

Rename	Type at the command line
Any directory	RENDIR *OldPath* [TO] *NewDirectoryName*
Default directory	RENDIR . *NewDirectory Name.*
Directory mapped to Drive G	RENDIR G: *NewDirectory Name*

■ DELETE DIRECTORIES AND FILES

Directories and files can be deleted either with DOS's RD (directory) and DEL (file) commands or with FILER.

With DOS commands

Delete directories. Consider the following example. Refer to the DOS manual for complete instructions.

✓ *Two restrictions apply:*

- *Directories must be empty.*
- *You can't be in the directory being removed or in any of its subdirectories.*

1. Change to the directory above the one you want to delete (p 6).
3. Type **RD *DirectoryName***, replacing ***DirectoryName*** with the directory being deleted. Press <Enter>.

Delete Files. Consider these examples:

To Delete	Type
Any file	DEL *FilePath*
All files in current directory	DEL *.* DEL . (v3.0 above)
All files in current directory with an .89 extension	DEL *.89
All Account files in current directory regardless of extension	DEL Account.*

With FILER

You can delete either directories or files using the same FILER menu.

1. Access *FILER → Directory Contents*.
2. Press <F2> and type or insert (p 6) the directory containing the subdirectory or file to be deleted. Press <Enter>.
3. Highlight (or mark) the subdirectories or files and press <Del>.
4. If you selected a subdirectory, indicate whether to delete the files or the subdirectory structure.

✓ *Use caution: deleting the structure deletes all files in the structure.*

5. Confirm your selection.

■ COPY DIRECTORIES AND FILES

Network directories and files can be copied using the following commands:

- DOS COPY (See your DOS manual)
- DOS XCOPY (See your DOS manual)
- NetWare NCOPY (See the opposite column for examples)
- FILER Options (See p 24)

Unlike the DOS commands, NCOPY verifies correct copying. Wildcard characters (**?** and *****) can be used.

NCOPY can be used with local workstation files; however, NetWare file attributes that are not supported by DOS are not retained.

From	To	Sample Command
Copy any file or directory		
Any directory	Another directory	NCOPY *SourcePath DestinationPath*
Default directory	Directory drive G is mapped to	NCOPY *FileName* TO G:
Directory drive G is mapped to	Default directory	NCOPY G: NCOPY G: *NewName* (Second command renames file)
Volume or file server drive G is mapped to	Volume or file server drive F is mapped to	NCOPY G: TO F:
Copy sets of files or directories		
Default directory	Drive H	NCOPY *.* TO H:
Copy directory structure (including **S**ubdirectories and **E**mpty directories)		
Drive F	Drive H	NCOPY F: /S /E TO H:

■ COPY OR MOVE FILES AND DIRECTORIES (with FILER)

1. Access *FILER → Directory Contents;* if necessary, change to the directory containing the files or subdirectories being copied or moved by pressing <F2> and typing or inserting (p 6) the correct directory path. Press <Enter>.

Copy or move entire subdirectory structure

2. Select a subdirectory.
3. Select the appropriate Copy/Move option.

Copy all files in selected subdirectories

2. Select one or more subdirectories.
3. Select *Copy Subdirectory's Files.*

Copy selected files

2. Select one or more files.
3. Select *Copy Files.*

4. Type the destination directory for the selected subdirectories or files or use the Insert method (p 6) to select the path. When the destination path is correct, press <Esc> to return to the destination directory box.
5. Press <Enter> to accept the displayed destination path. The selected files or directories are copied.

■ VIEW FILE OR DIRECTORY INFORMATION

Several NetWare utilities list file and directory information. Refer to the descriptions below and to the table on pages 2 6 and 27.

With FILER

1. Access *FILER → Directory Contents;* press <F2> to access the *Current Directory Path* entry box. Type or insert (p 6) the directory name. Press <Enter>.
2. Select a file or subdirectory.
3. Select *View/Set File (or Directory) Information.* A form appears listing the file or directory and such information as the owner and attributes.

With LISTDIR

To list a directory's **S**ubdirectories, Maximum **R**ights, **E**ffective rights, and creation **D**ates, type

LISTDIR [*Path*] /S /R /E /D

With NDIR

NDIR lets you view essential file system information from the workstation command line.

NDIR can also be used to sort and list files via one or more sorting principles such as owner or size (see p 28).

Sample commands appear below.

To	Type
Access NDIR Help screen	NDIR /Help
List files/directories in	
current directory	NDIR .
any directory	NDIR *Path*
List all files in directory and its subdirectories	
current directory	NDIR /SUB
any directory	NDIR *Path* /SUB

■ SUMMARY TABLE OF DIRECTORY AND FILE INFORMATION

The table below lists sample commands to access some (but not all) of the file and directory information NetWare tracks. Wildcard characters (* and **?**) can be used with most commands. Replace *Path* with a directory path or with the drive letter a directory is mapped to. *Path* can be omitted if you are viewing information about the current or default directory. Refer to the previous page for instructions for accessing the appropriate FILER menu.

Item	A single file	All files in a subdirectory	A single directory	All subdirectories in a directory
Owner	FILER NDIR [*Path*] *FileName*	NDIR [*Path*] /FilesOnly	FILER	NDIR [*Path*] /DirsOnly
Attributes	FILER NDIR [*Path*] *FileName*	NDIR [*Path*] /FilesOnly NDIR [*Path*] /Rights	FILER	
Dates				
Created or copied	FILER		LISTDIR [*Path*] /D FILER	LISTDIR [*Path*] /D/S NDIR [*Path*] /DirsOnly

Item	A single file	All files in a subdirectory	A single directory	All subdirectories in a directory
Last modified or updated	FILER NDIR [*Path*] *FileName*	NDIR [*Path*] /FilesOnly		
Last accessed	FILER			
Last archived	FILER			
Size	NDIR *FileName*	NDIR [*Path*] /FilesOnly		NDIR [*Path*] /Rights
Rights				
Effective/ Maximum	NDIR *FileName* /Rights	NDIR [*Path*] /Rights FILER	LISTDIR [*Path*] /R NDIR [*Path*] /Rights	NDIR [*Path*] /DirsOnly LISTDIR [*Path*] /R /S
Who has	FILER			
Trustees	TLIST [*Path*] *FileName*		TLIST [*Path*]	TLIST [*Path*] *

■ SORT FILES BY CATEGORIES

Use NDIR to sort files and subdirectories. Replace *Option* in the following command with one or more sorting principles.

NDIR [Path] [Option...]

Use REVERSE or NOT with options to reverse the sorting order or to exclude files or directories flagged with a specified attribute:

Read **O**nly	**H**idden	e**X**ecute Only	**T**ransactional
Shareable	**SY**stem	**I**ndexed	**A**rchive Needed

Separate options with a space. Type only boldface characters.

Use conditional statements to display only those files having certain properties. Conditional operators include the following:

SIZE (**GR**eater, **=**, **LE**ss)	OWNER (**=**)	CREATE
ACCESS	UPDATE	ARCHIVE

(Created or copied, accessed, updated, or archived: **BEF**ore, **=**, or **AFT**er a specified date)

The examples sort files in the PAY directory of the current volume.

To Display	Type
Ellen's files from smallest to largest	NDIR /PAY /SORT SIZE Owner = Ellen
Ellen's files from largest to smallest	NDIR /PAY /REVERSE SORT SIZE Owner = Ellen
Files larger than 2,000 bytes	NDIR /PAY /SIZE GR 2000
Files created before 4-20-89 and modified since, sorted by size	NDIR /PAY /Create BEF 4-20-89 Update AFT 4-20-89 SORT Size
All files not flagged Hidden and Read Only	NDIR /PAY/ NOT H RO
Only Macintosh files	NDIR /PAY /MAC

■ CHANGE DIRECTORY OWNER

View or change the owner of the current directory

1. Access *FILER*.
2. Select *Current Directory Information*. The *Directory Information* screen appears.

View or change the owner of a subdirectory

1. Access *FILER* → *Directory Contents;* press <F2> and type or insert (p 6) the appropriate directory path. Press <Enter>.
2. Select a subdirectory; select *View/Set Directory Information*. The *Directory Information* screen appears.

3. Select the *Owner* field. A list of users is displayed.
4. Select the user who will be the new owner.

Set the owner of multiple subdirectories

1. Access *FILER* → *Directory Contents;* press <F2> and type or insert (p 6) the appropriate directory path. Press <Enter>.
2. Mark the subdirectories or select them with an "Include" pattern (<F6>); then select *Set Owner.*
3. Type the name of the new owner or press <Ins> and select an owner from the list of users.
4. Press <Enter> to reset the directory's owner.

■ CHANGE DIRECTORY DATES AND TIMES

View or change the creation date or time of the current directory

1. Access *FILER*.
2. Select *Current Directory Information*.

View or change the creation date or time of a subdirectory

1. Access *FILER* → *Directory Contents;* press <F2> and type or insert (p 6) the appropriate directory path. Press <Enter>.
2. Select a subdirectory and then select *View/Set Directory Information*.

View or set the creation date or time of multiple subdirectories

1. Access *FILER* → *Directory Contents;* press <F2> and type or insert (p 6) the appropriate directory path. Press <Enter>.
2. Mark the subdirectories or select them with an "Include" pattern (<F6>).

3. Select the *Creation Date* or *Creation Time* field and type a new date, time, or both.
4. Press <Enter> to save the changes.

■ SET OR MODIFY FILE OWNERS

1. Access *FILER* → *Directory Contents;* press <F2> and type or insert (p 6) the appropriate directory path. Press <Enter>.

Set or modify a file's owner

2. Select a file and then select *View/Set File Information*. The *File Information* form appears.
3. Select the *Owner* field. A list of users is displayed.
4. Select the user you want to name as owner.

Set or modify the owner of multiple files

2. Mark the files to be given a new owner or select them with an "Include" pattern (<F6>). Press <Enter>.
3. Select *Set Owner.*
4. Type the name of the new owner or press <Ins> and select the owner from the list of users.
5. Press <Enter>.

■ SET OR MODIFY FILE DATES AND TIMES

1. Access *FILER → Directory Contents;* press <F2> and type or insert (p 6) the appropriate directory path. Press <Enter>.

Set or modify file dates (single file)

Use this procedure to set the creation date, last-accessed date, last-archived date, or last-modified date of a single file.

2. Select a file and select *View/Set File Information.*
3. Select the appropriate date field and type the new date.

Set or modify file dates (multiple files)

Use this procedure to set the creation date, last-accessed date, or last-modified date for multiple files.

2. Mark the files (p 7) or use an "Include" pattern (<F6>). Press <Enter>.
3. Select the appropriate date option from the *Multiple File Operations* menu.
4. Accept the default (today's date) by pressing <Enter> or type a new date in the field and press <Enter>.

■ ABOUT NETWORK DRIVES

Directory paths

Files stored on a file server's hard disk are organized into a directory structure (volume, directory, subdirectory) to make them easy to locate.

To locate a file, the file server must be supplied with a "path" to the directory containing the file as in the following example:

MACBETH \SYS:ACCOUNTS\PAY
(Fileserver\Volume:Directory\Subdir)

Drive mappings

So that you won't have to type the complete path every time you need to locate a particular file, NetWare allows you to "map a drive" (assign a letter) to the path to represent it (p 34). You can assign as many as 26 drive mappings.

For example, you could map the example path to drive H. Then, to change to the PAY directory, you could type **H:** instead of the complete path. NetWare recognizes three types of drives:

- Local — Drives reserved for workstation floppy or hard disks; usually assigned letters A-E.
- Network — Drives (logical pointers to information) on the file server's hard disk; usually assigned letters F-Z.
- Search — Drives NetWare searches if a requested file is not in the current directory; allows files to be accessed from any directory; can be assigned letters K-Z.

Drives can be mapped

For a session	Type the MAP command at the command line.
Automatically	Type the MAP command in the system or user login script; change, inactivate, or delete drive mappings as necessary.

■ CREATE OR CHANGE NETWORK DRIVE MAPPINGS

The following examples create drive mappings that are in effect for the current session only. To make them permanent, enter them into the system (p 51) or user (p 54) login script.

The examples that follow assume that MACBETH is the current file server and that the following directory structure has been created.

MACBETH\SYS:ACCOUNTS\PAY

BRUTUS\SYS:ACCOUNTS\OLD

Map a drive to a directory on your current file server

1. Type **MAP** to see which drive letters are available. Assume that G is not currently assigned.
2. To map drive G to an existing directory named ACCOUNTS, type

   MAP G:=SYS:ACCOUNTS

✓ *Because the drive is on the default file server, the file server's name doesn't need to be included in the MAP command.*

3. Change to drive G by typing **G:** and pressing <Enter>. The prompt should look like this: **G:\ACCOUNTS>**
4. To extend the mapping to the PAY subdirectory, type

   MAP PAY

✓ *Portions of the directory path already in the current directory don't have to be included.*

Map a drive to a directory on another file server

To map drive H to the ACCOUNTS\OLD directory on file server BRUTUS, include the complete directory path. Type

MAP H:=BRUTUS\SYS:ACCOUNTS\OLD

If you aren't attached to the file server (p 122) you are mapping to, NetWare prompts you for your username and password.

To	Type
Remap the current drive	
*To a specified directory	MAP *DirectoryPath*
To a directory one level back	MAP ..
To a directory two levels back	MAP...
To the root directory	MAP \
*Map a drive to a directory in another volume	MAP *Drive* := *Volume*\ *DirectoryPath*
*Map a relative drive (maps to the second letter after the last one reserved by DOS)	MAP *2:= *DirectoryPath*
*Map to a fake root	MAP ROOT *Drive* := *DirectoryPath*

*Can also be executed from a login script.

■ DELETE DRIVE MAPPINGS

Temporary mappings. To delete a temporary network drive mapping, log out or type

MAP DEL *Drive*:

or

MAP REM *Drive*:

Replace ***Drive*** with the letter of the drive being deleted. The mapping will be removed.

Mappings to a fake root. To remove a fake root mapping, remap the drive. Type

MAP *RootDrive*: = *NewDirectoryPath*

Replace ***RootDrive*** with the letter the fake root was mapped to.

Mappings in login scripts. To delete drive mappings entered in login scripts, remove the appropriate MAP command or make it inoperable by preceding it with a semicolon. Log out and log back in.

■ ADD, INSERT, or DELETE SEARCH DRIVES

Search drives locate executable files that are not found in the current directory.

Place mappings for executable files needed by all users (application files, for example) in the system login script and those needed by particular users in their user login scripts. Temporary mappings can also be entered at the command line.

Map search drives

To map (or remap) a search drive to a network directory, type

MAP S*n* : = *DirectoryPath*

Replace ***n*** with any number from 1-16 that hasn't already been assigned to a search drive. For example, the following command adds the SYS:ACCOUNTS\PAY directory to a workstation's search path, overwriting any existing directory assigned to S2:

MAP S2 : = SYS:ACCOUNTS\PAY

NetWare assigns the last available network drive letter to the search drive. If the specified position is later than the last open position in the path (for example, S12 is specified but only S1 through S7 are currently used), the drive is put in the next available position (in this case, S8).

Since NetWare doesn't allow "holes" in the search sequence, it is usually easiest to specify S16 (the last possible position) and let NetWare place the mapping in the proper sequence. Type

MAP S16:=*DirectoryPath*

We recommend that all search drive mappings entered in user login scripts use this format (MAP S16) so that mappings in the system login script will not be overwritten by those in user scripts.

Insert search drive mappings

MAP INSERT adds search drives without overwriting current NetWare search paths or those set with the DOS SET PATH command. Existing search paths are moved down one position.

✓ *No more than 16 search drive mappings can be created. This includes those created with the DOS SET PATH command.*

To insert a search drive, type

MAP INS S*n*:=*DirectoryPath*

Replace ***n*** with a number from 1 to 16. For example, if three search drives have already been defined and you specify S2, NetWare moves the drives formerly in positions S2 and S3 down one position (to S3 and S4).

The following command can be used repeatedly to insert search drive mappings at the beginning of the search path.

MAP INS S1:=*DirectoryPath*

Compare this command with MAP S16: (p 36), which adds search drives to the end of an existing sequence. These versions of MAP and MAP INSERT are especially helpful in user login scripts when you need to add search paths that might otherwise overwrite those defined in the system login script.

Delete search drive mappings

To delete a search drive mapping, type

MAP DEL S*n:*

or

MAP REM S*n:*

Replace ***n*** with the number of the search drive being deleted. The drive is deleted from the search path and the numbers of any subsequent mappings are reassigned.

■ BACK UP DATA

Use the NBACKUP instructions that follow to back up one or more file servers, NetWare binderies, or network and local directories.

BACKUP Overview

BACKUP reads data from a source file server, directory, or local drive and writes it to one or more files in a destination directory you specify on either DOS or non-DOS devices.

During the session, NetWare creates backup and error logs for the session and stores them in a separate working directory located either on the backup device or on the drive you specify.

These backup logs must be used when you restore data. For this reason, we recommend that you store the log files with the backup. Although the working directory can't be located on removable media during the backup, you can copy the log files to one of the disks or tapes when the session is over.

Preliminary Steps

1. Make sure the NBACKUP files from the BACKUP NetWare installation diskette are loaded into SYS:PUBLIC.
2. Determine whether you will be backing up to a DOS or non-DOS device.

   Non-DOS devices. These require adding a driver specific to the device. Follow the general instructions below to install the driver. Consult the driver's documentation for additional instructions.

   — Place the diskette containing the driver in drive A and type

   NCOPY A:*DRIVER.EXE* [TO] SYS:PUBLIC

   — Use a text editor to include a line like the following in the DIBI$DRV.DAT file (in SYS:PUBLIC).

   "Text to appear in NBACKUP menu" DRIVER

   Replace the string inside the quotation marks with the text you want to be displayed in the opening NBACKUP menu (for example, "GigaTrend GIGA 1236"). Replace ***DRIVER*** with the name of the specific driver.

— Repeat these steps to install other drivers, as needed.
— Install the hardware (the tape backup unit, for example) in the workstation according to the manufacturer's instructions.

DOS devices. Make sure you can modify data already on the media. If the data won't fit on one DOS device (a local hard disk, for example), divide the backup into multiple sessions.

The following fixed and unlimited capacity DOS devices can be used.

Fixed capacity. Make sure that there is 10% more space available than that needed for the data.

- Network drives
- Local hard drives
- WORM drives

Unlimited capacity (removable media). Tape drives rewind when you start a new session. Make sure that you don't overwrite data if you divide the backup into multiple sessions.

- Floppy drives
- Streaming tape drives (that have a DOS device driver)
- Optical read/write drives (that have a DOS device driver)

3. Assign the following rights to users who will be backing up or restoring their own directories:

   Back up: **R**ead and **F**ile Scan (in the source directory)

   Restore: **C**reate, **E**rase, **F**ile Scan, **M**odify, and **W**rite (in the destination directory)

✓ *Only a supervisor-equivalent user (p 71) can back up the file server. In addition, the file server must be the current server.*

4. Temporarily change the attributes (p 68) for any **H**idden or **SY**stem directories. This version of NetWare backs up **H**idden and **SY**stem files, but not directories, flagged with these attributes.

Run NBACKUP

1. At a network workstation prompt, type **NBACKUP**. (The workstation can't be used for other tasks until the backup is complete.)

✓ *You can* abort a session at any time by pressing <Esc>. *If the session has begun, the program will be aborted as soon as the current item has been completed. If the session is terminated prematurely, the backup files will be deleted, but not the session logs.*

2. Select *DOS Devices* or one of the listed non-DOS devices. This option appears only if you have loaded non-DOS drivers. See "Non-DOS devices" (p 38) to load additional drivers.
3. Select the server whose data you are backing up.
   — If you are attached to the right server, skip to Step 4.
   — If you need to attach to additional servers, do the following:
      a. Select *Change Current Server.*
      b. Press <Ins> and select a server from the list of those available.
      c. Press <Esc> twice to return to the *Main Menu.*
4. Select *Backup Options.*
5. Specify a working directory to store the backup and error logs NetWare creates during the session.
   — Select *Select Working Directory.*
   — Type or insert (p 6) the name of the directory (NetWare creates the directory if it doesn't already exist.)

✓ *The working directory can't be located on removable media. Copy the backup and error logs to the removable media after the session is over, if necessary.*

   — When the appropriate path appears in the entry box, press <Enter> and confirm your selection.
6. Select *Backup File Server* or *Backup By Directory.* A form listing backup options appears.

7. Complete the following as necessary.

   Either option.

   — Type a description of the session in the *Session Description* field.

   — Accept the defaults or modify the other fields on the form as necessary. Press <F1> for a description of each field.

   — Select the *Destination Directory* field and type or insert (p 6) the name of the directory that will receive the backup. (If you are using a non-DOS device, a destination directory is already chosen and the option doesn't appear.)

   Backup By Directory. Specify the name of the directory you are backing up in the *Source Directory* field.

   — Select the field and type or insert (p 6) the directory path in the window that appears.

   — When the path is complete, press <Enter>.

   Backup File Servers. (This option does not appear unless you are logged in to the current server as a supervisor-equivalent user.) Make sure the media you are using will accommodate all file server data. If not, divide the backup into several sessions (use the *Backup By Directory* option).

8. Begin the backup session by pressing <Esc> and confirming the selections on the *Backup Options* form. The *Start Backup* menu appears. Select one of the following:

   — Start Backup Now. Select this option to begin the backup.

   — Start Backup Later. Enter the date and time you want the backup to begin.

   Remember that the workstation you are using remains dedicated to the backup until the session is finished.

   When a time-delayed backup ends, you are prompted for passwords to all attached file servers. If correct passwords are not supplied within 30 minutes, you are automatically logged out.

As soon as the session begins, windows appear showing the status of the backup session and any errors that may occur. Refer to the following explanations if they apply in your situation.

Backing up to removable media. If you are using removable media, a Media ID field displays the current tape cartridge or disk number. Label the disks or cartridges with these numbers to show the order in which you will need to insert them when restoring data.

Backing up file servers on non-DOS media. If you are backing up an entire file server, NBACKUP pauses between backing up the bindery and backing up the directories. Insert a new cartridge at this point. Otherwise, the directory backup will overwrite the bindery backup.

9. When the session is complete, press <Enter> to return to the *Backup Menu*. You can begin another session or exit NBACKUP (press <Esc>).

■ VIEW BACKUP AND ERROR LOGS

Backup log. The items backed up in a session are recorded in a backup log in the working directory specified at the beginning of the session. Bindery backups are logged in separate files.

Error log. Errors that occur during a backup or restore session are recorded in an error log stored in the session's working directory. The error log is especially useful in determining whether you will need to repeat all or part of an unattended backup or restore.

View the logs. Both logs can be viewed from within NBACKUP or with a text editor. Bindery logs must be viewed with a text editor.

1. Run NBACKUP, choose the appropriate device type, and select either *Backup Options* or *Restore Options*.
2. Select *View Error Log* or *View Backup Log*, and, if prompted, supply the name of the appropriate working directory.
3. Select the session whose error log you want to view.

■ RESTORE DATA FROM BACKUP FILES

You must restore data to the system type from which the backup originated. For example, if you backed up data from a local drive, you must restore the data to a local drive; if you backed up from a NetWare v2.2 system, you must restore to a NetWare v2.2 system.

Follow the instructions below to restore data to your network.

1. At a network workstation prompt, type **NBACKUP**. (The workstation can't be used for other tasks until the restoration is complete.)

✓ *You can abort a session at any time by pressing <Esc>. If the session has begun, the program will be aborted as soon as the current item has been completed.*

2. Select the device used to make the backup (*DOS Device* or a listed non-DOS device). The *Main Menu* appears.
3. Select the server you are restoring to.
   - — If you are attached to the correct server, skip to Step 4.
   - — If you need to attach to additional servers, do the following:
     a. Select *Change Current Server.*
     b. Press <Ins> and select a server from the list of those available.
     c. Press <Esc> to return to the *Main Menu.*
4. Select *Restore Options.*
5. Specify the working directory containing the backup and error logs NetWare created during the backup session.
   - — Select *Select Working Directory.*
   - — Type or insert (p 6) the name of the directory.
   - — When the appropriate path appears in the entry box, press <Enter>.

6. Select *Restore Session.*
7. Select the session you want to restore from. The *Restore Option* form appears.

   If you have moved the backup files from their original location, select the *Data Location* field at the bottom of the form and type or insert (p 6) the correct location. Press <Enter> to return to the *Restore Option* form.

   Refer to the following as necessary.

   Restore bindery files. The bindery should be restored only if it has been lost or corrupted. If you are restoring both the bindery and files, restore the bindery first to restore trustee assignments.

   Restore other files. Accept the defaults or modify the fields on the form as necessary. Press <F1> for a description of each field.

   Select each field to list available options. Notice in particular that specifying any directories in the list of *Directories to Include* or *Files to Include* automatically excludes all other directories or files.
8. When the restore options are complete, press <Esc> and confirm your selections. The *Start Restore* menu appears. Select one of the following:
   - — Start Restore Now. Select this option to begin the backup.
   - — Start Restore Later. Enter the date and time you want the restore session to begin.

   As soon as the session begins, status windows appear listing the files and directories being restored.
9. When the session is complete, press <Enter> to return to the *Backup Menu*. You can begin another backup or restore session or exit NBACKUP (press <Esc>).

■ RECOVER A DELETED FILE

Files deleted from the file server are hidden from the user but remain on the disk until the user deletes another file or logs out.

If the following conditions are met, a file (or a group of files deleted with the same DELETE or ERASE command) can be restored.

- Do not log out of the file server.
- Do not create or delete any other files on the same volume.
- Do not issue a PURGE command.
- Recover the file at the same workstation it was deleted from.

1. To recover the most recently deleted file, access *SALVAGE → Recover Deleted Files*. The files that can be recovered are listed.
2. Select or mark the files you want to recover.

✓ *Change the volume, if necessary, by selecting Select Current Volume and typing or inserting (p 6) the appropriate volume.*

3. Exit by pressing <Esc> twice. Salvaged files are returned to the directory they were deleted from.

■ PURGE DELETED FILES

Any file a user deletes remains on the file server's hard disk until the user deletes another file or logs out. Occasionally, you may want to release disk space for other uses before either of these conditions occurs.

To purge deleted files that are still salvageable (the owner hasn't deleted other files on the same volume or logged out), type

PURGE [*FileName*] [/ALL]]

If you type PURGE alone or with *.*, all recoverable files in the current directory and its subdirectories are deleted.

✓ *You must be attached to a file server to purge its files. You must be the owner of a file to purge it.*

Salvageable files can also be deleted with FCONSOLE. Access *FCONSOLE → Purge all Salvageable Files* and confirm the deletion.

Notes

LOGIN SCRIPTS

48

Login Scripts

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Login scripts are similar to configurable batch files and are executed when a user logs in. NetWare uses three kinds of scripts:

Default	Executes if system and user scripts are not created.
System	Created by the supervisor. Contains mappings and other commands to be executed for all users.
User	Created by the user or supervisor. Contains commands specific to the particular user's environment. Executes after the system script (overwrites conflicting commands). If user scripts are not created, NetWare executes the default script (can overwrite system mappings).

■ LOGIN SCRIPT CONVENTIONS

As a general rule, commands entered into login scripts require the same format as they would if they were entered at the command line. Refer to the following guidelines:

Case	Either upper- or lowercase. Exception: identifier variables (p 56) enclosed in quotation marks must be uppercase.
Characters per line	150 max; 78 (screen width) suggested.
Commands per line	One. Consider the following: • Start each command on a new line. • NetWare considers lines that wrap automatically as one command. • End commands by pressing <Enter>. • WRITE commands display better if the command (WRITE) is repeated at the beginning of each wrapped line.
Punctuation and programming symbols	Type symbols (#, %, " ") and punctuation exactly as shown in examples.
Sequence	ATTACH commands must precede MAP commands. Enter other commands in the order you want them to execute during login. If sequence is not important, group similar commands (all MAP commands, for example) to make them easier to read.
Blank lines	Have no affect on login script execution. Use them to visually separate groups of commands.
Semicolons Asterisks REM[ARK]	Use these to insert remarks (explanations) NetWare will not interpret as commands to be executed. Placing any of these at the beginning of a command disables the command until the symbol is removed.

■ LOGIN SCRIPT COMMANDS

The following chart summarizes commands used in login scripts:

ATTACH	Attaches users to additional file servers.
BEGIN/END	Must enclose nested IF...THEN commands. See sample scripts. Press <Enter> after BEGIN.
BREAK On/Off	Determines whether login script execution can be interrupted.
COMSPEC	Locates the COMMAND.COM (DOS) file for the computer and DOS version to be used after an application program is exited.
DISPLAY and FDISPLAY	Displays the text of a specified file on the screen.
DOS BREAK	Controls whether programs or DOS can be interrupted by pressing <Ctrl-Break> or <Ctrl-C>.
DOS SET	Sets a DOS variable to a specified value.
DOS VERIFY	Ensures that data copied to a local drive is copied correctly.
DRIVE	Specifies which drive is the default drive.
EXIT	Aborts the login procedure to allow users to access another file, program, or menu.
# (EXTERNAL PROGRAM EXECUTION)	Allows users to execute a command that is external to the login script. Should not be used with terminate-and-stay-resident programs.
FIRE PHASERS	Produces a phaser sound.
IF. . . THEN	Sets conditions under which login commands will be executed. See "Identifier variables" on page 56 for examples.
INCLUDE	Accesses text files (subscripts) not usually included in the login script.

MACHINE	Specifies which computer (machine name) is being used for the workstation in question.
MAP	Maps a drive to a directory on the network.
PAUSE	Stops login script execution until a key is pressed. (Allows users to read screen displays.)
PCCOMPATIBLE	Informs the login program that a machine is IBM-PC compatible.
REMARK	Allows users to insert descriptive comments (as opposed to commands) into the login script.
WRITE	Writes the specified string on the screen during login. See also "Identifier variables" (p 56).

■ CREATE OR MODIFY A SYSTEM LOGIN SCRIPT

The system login script sets the network environment for all users. If you create a system script, we recommend creating user scripts (p 54), however minimal (even one space will do). If user scripts are not created, NetWare accesses a default user script that may overwrite system mappings.

1. Access *SYSCON → Supervisor Options → System Login Script.* A window appears in which you can enter login commands.
2. Do one of the following:
   - — Create a script. Type the commands you want to include in your system login script. Refer to the sample system login script on pages 52 and 53 for suggestions.
   - — Add a command. Position the cursor at the end of the previous line. Press <Enter> and type the new command.
   - — Delete a command. Use the delete keys to remove unwanted commands.
3. Press <Esc> and confirm the entries or changes.

■ SAMPLE SYSTEM LOGIN SCRIPT

Essential Commands	Description
MAP INS S1:=SYS:PUBLIC	Inserts a search drive mapping (p 36) that provides access to the NetWare utilities' directory from any other directory.
MAP INS S2:=SYS:PUBLIC\%MACHINE\%OS\ % OS_VERSION	Inserts a search drive mapping (p 36) to the DOS directory. NetWare replaces the identifier variables (%MACHINE, % OS, and % OS_VERSION) with the machine type identified in the workstation's SHELL.CFG file and the DOS operating system and DOS version specified in COMMAND.COM.
COMSPEC=S2:COMMAND.COM	Works with the MAP INSERT command above to ensure that the COMMAND.COM file (the file that interprets DOS commands) will reload properly when users exit an application. COMSPEC must be mapped to the same search drive (S2 in this example) the DOS directory is mapped to.
MAP INS S3:=SYS:PUBLIC\WP	Maps a search drive to a word processing application (or any other directory) all users need access to. Replace the directory and subdirectory names with those for your system.

Recommended or Optional Commands	Description
IF LOGIN_NAME != "Supervisor" THEN MAP *1:=SYS:USERS\%LOGIN_NAME	Maps a drive to each user's directory—if the user is not (!=) supervisor. This example assumes that user directories are located in SYS:USERS and that the user directory name is the same as the username.
IF MEMBER OF "Accounting" THEN MAP *2:=SYS:PAYROLL	Maps a drive to the PAYROLL directory if the user is a member of the ACCOUNTING group.
IF MEMBER OF "WRITERS" THEN BEGIN MAP *3:=SYS:ARTICLES MAP *4:=SYS:PROJECTS END	Maps the third available network drive to the ARTICLES directory and the fourth available drive to the PROJECTS directory if the user is a member of the WRITERS group. (The drive mapping commands are enclosed by BEGIN and END commands because more than one command is being entered.) Press <Enter> after BEGIN.
SET PROMPT = "PG"	Sets the DOS prompt to display the current drive letter and directory path so that users can see where they are in the directory structure.

■ MODIFY, CREATE, OR COPY A USER LOGIN SCRIPT

Create user login scripts to modify or enhance the network environment for an individual. User scripts execute after and overwrite the system script. Do not use the same numbered search drives the system script uses or system search drive mappings will be overwritten.

1. Access *SYSCON* → *User Information,* select the user you are creating a script for, and then select *Login Script.*

Modify an existing script

2. Use the delete keys to delete any unnecessary commands.
3. Insert new commands by positioning the cursor at the end of the previous command and pressing <Enter>. Type the command.
4. Press <Esc> and confirm the changes.

Create a new script

If a login script doesn't exist, an entry box appears, containing the name of the user the script is being created for.

2. Press <Enter>.
3. Type the script in the box provided. See page 55 for example commands.
4. Press <Esc> and confirm changes.

Copy an existing script

If a login script doesn't exist, an entry box appears, containing the name of the user the script is being created for.

2. Delete the name, type the name of the user whose script is being copied, and press <Enter>.
3. Modify the copied script according to the instructions in the first column.

■ SAMPLE USER LOGIN SCRIPT

Sample Commands	Description
map f:=pdaccounts\sys:users\Tom	Maps a drive (p 34) to this user's user directory.
map s16:=pdaccounts\sys:appl\wp	Maps a search drive (p 36) to an application this user frequently accesses.
#newmail brutus\sys:appl tlarson	Executes a program (NEWMAIL) that notifies the user of new electronic mail. After the program has run, the remaining login script is executed.
attach shakespeare\Tom	Attaches the user to an additional file server that is accessed frequently.
map g:=shakespeare\Sys:reports\weekly	Maps a drive to a directory on the file server attached to in previous line.
if NDAY_OF_WEEK = "2" then begin write "Please delete any unnecessary files you" write "own on BRUTUS. Back up all files." end	Displays the message enclosed in quotes on Monday. Note that "write" is repeated (to enhance the readability of the screen display) at the beginning of each line and that quotation marks enclose each line of the message. Because more than one command is included, the series is enclosed by BEGIN and END commands.
#capture q=Laser_Q nb nff	Reroutes local print jobs to a network print queue (Laser_Q). Specifies that jobs be printed without a banner. Form feed is disabled.
Exit "MENU TOMSMENU"	Exits to a menu (must map a search drive to the directory containing menu script).

■ USE IDENTIFIER VARIABLES IN LOGIN SCRIPTS

The following chart lists identifier variables used in IF...THEN and WRITE commands. Precede variables embedded in commands (see WRITE examples) with a percent sign (%) and type them in uppercase. Compare LOGIN_NAME and FULL_NAME examples on page 57.

Identifier variable	Explanation	Sample login script command	Screen display at login
HOUR	1-12	IF HOUR < "8" AND AM_PM ="AM" THEN WRITE "You're early!"	You're early! (if logging in before 8 a.m.)
HOUR24	00-23 (midnight = 00)	IF HOUR24 >"18" THEN WRITE "Working late?"	Working late? (if logging in after 6:00 p.m.)
MINUTE SECOND AM_PM	00-59 00-59	WRITE " %HOUR: %MINUTE: %SECOND:" WRITE "%AM_PM"	6:30:45 pm (or time of log in)
MONTH	01-12	IF MONTH="06" THEN WRITE "Reports due!"	Reports due! (if logging in in June)
MONTH_NAME	May, June	IF MONTH_NAME ="June" THEN WRITE "Reports due!"	Reports due! (if logging in in June)
DAY	Of month; 01-31	IF DAY = "10" THEN WRITE "Pay bills"	Pay bills (if logging in on tenth day of month)
DAY_OF_WEEK	Monday, Friday	IF DAY_OF_WEEK = "Friday" Fire Phasers 3	Three phasers sound on Fridays

NDAY_OF_WEEK	1- 7; Sunday =1	IF NDAY_OF_WEEK = "6" Fire Phasers 3 Times	Three phasers sound on Fridays
YEAR	Full form: 1991	WRITE "%DAY %MONTH_NAME, %YEAR"	25 June, 1990 (or date of login)
SHORT_YEAR	Short form: 91	WRITE "%DAY/ %MONTH/ %SHORT_YEAR"	25/ 06/ 90 (or date of login)
LOGIN_NAME	User's login name	WRITE "Hello % LOGIN_NAME"	Hello, Sue (username of person logging in)
FULL_NAME	User's full name	WRITE "Hello,"; Full_name	Hello, Sue Jones (full name in SYSCON file)
STATION	Connection number	WRITE "Hello %STATION"	Hello 16 (number of station logging in from)
P_STATION	Node address (12 hex)	WRITE "%P_STATION"	00001B041148 (workstation node address)
GREETING_TIME	Morning, evening	WRITE "GOOD %GREETING_TIME"	Good Morning (or afternoon or evening)
MACHINE OS_VERSION SMACHINE	Machine name: IBM_PC Workstation's DOS version Short machine name: IBM	MAP S2:=SYS:PUBLIC\%MACHINE\%OS_VERSION	Maps a drive to the DOS directory the workstation uses.
ERROR_LEVEL	0 = no errors	IF "%ERROR_LEVEL" = " 0" THEN EXIT DB	DB program executes (unless errors exist)
MEMBER_OF *"GROUP"*	Group user belongs to	IF MEMBER_OF "Sales" THEN WRITE "Meeting at 3:00"	Meeting at 3:00 (if the user is a member of the group SALES)
PASSWORD_EXPIRES	Days to expiration	WRITE "Password expires in" WRITE "%PASSWORD_EXPIRES day(s)!"	Password expires in 5 day(s)! (or number of days until expiration)

Notes

SECURITY

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Security

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■ ABOUT SECURITY

Levels of security. Network security is implemented at three levels:

User	You can assign password restrictions, limit station access, specify which hours users can be logged in, and assign trustee rights to limit directory and file access.
Directory	You can modify the Maximum Rights Mask of a directory and assign attributes to files and directories to limit access to them.
Network	You can lock out intruders and monitor network security.

Rights. NetWare rights are listed below.

Right	Allows users to
Read	Open and read files.
Write	Open and write to files.
Create	Create directories and files and write to files. (To allow users to reopen files they create, also grant the Read right.)
Erase	Delete a file or a directory and its subdirectories and files.
Modify	Rename directories and files and change their attributes.
File Scan	View directories or files in directory searches.
Access Control	Modify trustee assignments and Maximum Rights Masks; grant or revoke other users' rights; remove trustees.

Rights can be assigned to users (Trustee rights) or directories (Maximum Rights Mask). The user's rights in a file depend on the combination of the two and whether file attributes (p 68) allow the right.

Effective rights

Trustee Rights	R	W		E	M	F	A
Directory Rights	R	W	C			F	
Effective Rights	R	W				F	

To view effective rights	Type
In default directory	RIGHTS or NDIR /RIGHTS
In any directory	RIGHTS [*Path*] or LISTDIR [*Path*] /R
In directory mapped to drive G:	RIGHTS G:
In subdirectories beneath *path*	NDIR [*Path*] *SubName* /SUB /RIGHTS

✓ *Rights (a Maximum Rights Mask) can't be assigned to files with this version of NetWare. Users have the same effective rights in a directory's files as they have in the directory.*

Directory and file attributes. Access to directories and files can also be limited by assigning attributes that cancel the effect of trustee assignments and rights allowed by the directory's Maximum Rights Mask.

✓ *Only* ***H*** *and* ***Sy*** *apply to directories.*

Attribute	Description
Hidden	Hides files from DIR scans.
Indexed	Creates an index in memory to improve file access; usually reserved for large files.
Read**W**rite (**N**ormal)	Allows users to modify files. Files are **N**ormal unless flagged otherwise and return to **N**ormal when other flags are removed.
Read**O**nly	Prevents users from modifying files. If **RO** is not set, files are automatically flagged Read Write (**RW**).
Shareable	Allows several users to access files simultaneously.
System	Hides files from DIR scans; prevents deleting or copying. Usually assigned to operating system files.
Transactional	Tracks the transactions in a file; ensures that all changes are made to a file being modified or that none are.

■ ASSIGN PASSWORD RESTRICTIONS

1. Decide whether to assign system-wide or individual restrictions:
   - System-wide restrictions. (Must be assigned before creating the user.) Access *SYSCON → Supervisor Options → Default Account Balance/Restrictions.*
   - Individual restrictions. Access *SYSCON → User Information.* Select a user and then select *Account Restrictions.*
2. Complete the following as necessary:
   — Require passwords: type Y or N and enter the minimum number of characters passwords can contain.
   — Allow users to change their own passwords: type Y or N.
   — Force users to change their passwords periodically; type Y or N. If Yes, specify the number of days between changes; accept the default expiration date or type a new date.
   — Limit grace logins: type Y or N. If Yes, enter the number of times users can log in after passwords have expired.
   — Require unique (to the specified user) passwords: type Y.

■ SET OR CHANGE A USER'S PASSWORD

1. Access *SYSCON → User Information.*
2. Select a user and then select *Change Password.*
3. Enter a new password; reenter the new password to verify it.

✓ *If the supervisor sets passwords for users, users are prompted to change their passwords when they log in.*

Users having accounts on several file servers may want to set the same password on all servers:

1. Log in and attach to all file servers on which you have accounts that will use the same password.
2. Type **SETPASS** at the command line.
3. Enter and reenter a new password for the current server. You will be asked whether you want to synchronize passwords on all servers.
4. Type Y to synchronize passwords.

■ VIEW, ASSIGN, OR DELETE TRUSTEES (with FILER)

View the trustees of the current directory

1. Access *FILER*.
2. Select *Current Directory Information*.
3. Select the *Trustees* field on the information screen. A list of trustees and their rights is displayed.

View the trustees of a subdirectory

1. Access *FILER → Directory Contents*. Press <F2> and type or insert (p 6) the directory path immediately above the subdirectory whose trustees you want to view. Press <Enter>.
2. Select a subdirectory and then select *View/Set Directory Information*.
3. Select the *Trustees* field on the information screen. A list of trustees and their rights is displayed.

Assign trustees

4. Press <Ins> to list users and groups that can be given trustee status.
5. Select (or mark) one or more of the listed users or groups.

Delete trustees

4. Highlight or mark one or more users or groups on the list of current trustees.
5. Press <Del> and confirm your deletion.

■ VIEW, ASSIGN, OR DELETE TRUSTEES (at the command line)

View trustees

In	Type
Default directory	TLIST
Any directory	TLIST [*Path*]
Directory mapped to drive G	TLIST G:
All directories in path	TLIST [*Path*] *.*

Assign trustees

Any user or group granted trustee rights to a directory with the GRANT utility (p 67) automatically becomes a trustee of that directory.

Users and groups can also be added to the trustee list with SYSCON, FILER, or MAKEUSER. Refer to the Master Index to locate instructions.

Delete trustees

✓ *You can remove only one user or group with each command.*

To Delete From	Type
Default directory	REMOVE David
Directory mapped to drive G:	REMOVE David G:
Any directory	REMOVE David [*path*]
All subdirectories in path	REMOVE David [*Path*] /SUB

■ VIEW, ASSIGN, OR DELETE DIRECTORY TRUSTEE RIGHTS (with FILER)

View trustee rights in the current directory

1. Access *FILER → Current Directory Information.*
2. Select the *Trustees* field on the information screen. A list of current trustees and their rights is displayed.
3. Add users to the trustee list, if necessary, by pressing <Ins> and selecting or marking the users. Press <Enter>.

View trustee rights in a subdirectory

1. Access *FILER → Directory Contents.* Press <F2> and type or insert (p 6) the appropriate directory path. Press <Enter>.
2. Select a subdirectory and then select *View/Set Directory Information.*
3. Select the *Trustees* field on the information screen. A list of current trustees and their rights is displayed.

Assign trustee rights to a user or group

4. Select a trustee; a list of current rights is displayed.
5. Press <Ins> to display other rights that can be granted.
6. Select (or mark) one or more trustee rights.

Delete trustee rights from a user or group

4. Select a trustee; a list of current rights is displayed.
5. Highlight one or more trustee rights on the list.
6. Press <Del> and confirm the deletion.

■ VIEW, ASSIGN, OR DELETE DIRECTORY TRUSTEE RIGHTS (at the command line)

✓ *Trustee rights can be assigned only at the directory level with this version of NetWare.*

View trustee rights

In	Type
Default directory	RIGHTS or TLIST
Any directory	RIGHTS [*Path*]
Directory mapped to drive G	RIGHTS G: or TLIST G:
All directories in path	TLIST [*Path*]

Assign trustee rights

✓ *You must be attached to a file server to assign trustee rights to users on that server. Separate rights with a space.*

To Grant	Type
R and C to Sue in default directory	GRANT /R /C to Sue
R and C to Sue in any directory	GRANT /R /C for [*Path*] to Sue
All except C to Sue in default directory	GRANT ALL BUT /C to Sue
All rights to Sue in default directory	GRANT /ALL to Sue

Delete trustee rights

✓ *You can remove rights from only one user or group with each command. Separate rights with a space.*

To Revoke	Type
C and M from Sue in default directory	REVOKE /C /M from Sue
C and M from Sue in any directory	REVOKE /C /M for [*Path*] from Sue
All rights from Sue in directory mapped to drive G:	REVOKE /ALL for G: from Sue

✓ *Users need the **A**ccess Control right to delete trustee rights from other users.*

■ VIEW, ASSIGN, OR DELETE FILE OR DIRECTORY ATTRIBUTES (with FILER)

View the attributes of the current directory

1. Access *FILER*.
2. Select *Current Directory Information*.
3. Select the *Directory Attributes* field on the information form. A form appears listing current attributes.

View the attributes of a subdirectory or file

1. Access *FILER → Directory Contents*. Press <F2> and type or insert (p 6) the needed directory.
2. Select a file or subdirectory and then select *View/Set File (or Directory) Information*.
3. Select the *Attributes* field. A form appears listing current attributes.

View the attributes of multiple files

1. Access *FILER → Directory Contents*.
2. Press <F2> and type or insert (p 6) the needed directory. Press <Enter>.
3. Mark the files and select Set *Attributes*. A form appears listing current attributes.

Assign attributes

4. Press <Ins> to display the attributes that can be added.
5. Select (or mark) one or more attributes on the list.

Delete attributes

4. Highlight one or more of the attributes.
5. Press <Del> and confirm the deletion.

■ VIEW, ASSIGN, OR DELETE DIRECTORY ATTRIBUTES (with FLAGDIR)

To	Type
View attributes of current directory	FLAGDIR
View attributes of any directory	FLAGDIR [*DirectoryPath*]
Cancel current attributes (return to **R**ead**O**nly)	FLAGDIR [*DirectoryPath*] /N
Assign multiple attributes	FLAGDIR [*DirectoryPath*] *AttributeList*

✓ *Separate attributes with spaces if you specify more than one.*

Refer to the chart on page 62 for a description of directory attributes or type **FLAGDIR HELP** at the command line.

■ VIEW, ASSIGN, OR DELETE FILE ATTRIBUTES (with FLAG)

To	Type
View file attributes	FLAG [*DirectoryPath*] *FileName*
Assign **I**ndexed and **S**hareable attributes to the TEST file	FLAG [*DirectoryPath*] Test /I /S
Cancel (-) the **S**hareable attribute for the TEST file	FLAG [*DirectoryPath*] Test **-** /S
Cancel current attributes (return to **N**ormal (**RW**))	FLAG [*DirectoryPath*] *FileName* /N

✓ *Separate multiple attributes with spaces.*

Refer to the chart on page 62 for a description of file attributes.

■ VIEW, ADD, OR DELETE A DIRECTORY'S MAXIMUM RIGHTS

View maximum rights in the current directory

1. Access *FILER → Current Directory Information*. The directory's current Maximum Rights Mask appears on the *Information* form.
2. Select the *Maximum Rights Mask* field. A form appears listing current rights.

View maximum rights in a subdirectory

1. Access *FILER → Directory Contents*. Press <F2> and type or insert (p 6) the needed subdirectory path. Press <Enter>.
2. Select *View/Set Directory Information* and then select the *Maximum Rights Mask* field. A form appears listing current rights.

Add maximum rights

3. Press <Ins> to display rights not yet granted.
4. Select (or mark) one or more rights from the list.

Delete maximum rights

3. Highlight or mark one or more items on the rights list.
4. Press <Del> and confirm the deletion.

■ ASSIGN OR REVOKE SECURITY EQUIVALENCES

You can assign a user appropriate security equivalences. Use caution. A security equivalence gives one user access to all directories and files of another user.

This option is especially useful if you need to assign John, for example, temporary rights as system supervisor or allow him to access all the directories and files David can access. Making John security equivalent to David is easier than assigning John trustee rights in all the directories David uses.

1. Access *SYSCON → User Information.*
2. Select the user you will be granting another user's rights to.
3. Select *Security Equivalences.* A form appears listing current security equivalences, if any.
4. Do one of the following:
   - — Assign a security equivalence. Press insert and select (or mark) the users or groups to whom this user will be equivalent.
   - — Revoke a security equivalence. Select (or mark) the users or groups you no longer want this user to be equivalent to. Press <Del> and confirm the deletion.

See also: "Assign or Delete Managers and Operators" (p 18)

■ MONITOR NETWORK SECURITY

The SECURITY utility checks the file server bindery to identify possible security breaches and then displays the information so that you can take whatever actions are necessary.

To evaluate security on a file server, complete the following steps.

1. Change to the SYS:SYSTEM directory (p 6).
2. Do one of the following:
   - — Display the evaluation on the screen. Type **SECURITY.** To temporarily pause screen scrolling, press <Ctrl-S>. Press any key to continue.
   - — Redirect output to a file. Type **SECURITY/*FileName***

Each user's security violations are displayed. The following items are evaluated.

Problem	Explanation
Passwords	Unless passwords are assigned, anyone who knows (or guesses) a username can log in.
Insecure Passwords	Passwords that are not unique to the user or are too short are flagged. Change passwords often and limit grace logins.
Supervisor equivalence	Users with supervisor equivalence are listed so that you can verify their need for supervisor rights.
Root directory privileges	Users with rights to the root directory have rights to the entire volume unless those rights are revoked at a lower level. Be cautious granting the **A**ccess Control right in a root directory because users can then grant all other rights to other users in any subdirectory on the volume.

Problem	Explanation
Using default login scripts	Login scripts are kept in the user's mail directory (where users have **C**reate rights). Another user could create a login script file for any user who doesn't have one and gain access to the system.
Excessive rights	Access to default directories (SYSTEM, PUBLIC, LOGIN, and MAIL) is limited through a rights assignment. SECURITY tracks any changes to these assignments to alert you to possible security breaches.

Notes

■ ACTIVATE INTRUDER DETECTION/LOCKOUT

If intruder detection is activated and someone enters an incorrect password a preset number of times, the file server assumes an "intruder" is trying to gain access to the system and locks the intruder out.

Use caution; the file server locks out anyone who enters an incorrect password, intruder or valid user.

1. Access *SYSCON → Supervisor Options → Intruder Detection/Lockout.*
2. Type Y in the *Detect Intruders* field and press <Enter>.
3. Specify how many incorrect login attempts to allow.
4. Specify how much time must elapse before the file server will again allow logins to the account.
5. Specify whether to lock the account by typing Y or N.
6. If Y, enter the amount of time the account will remain locked.
7. Press <Esc> to exit the form and save your changes.

✓ *Changes will be in effect the next time you log in.*

■ DEACTIVATE INTRUDER DETECTION/LOCKOUT

1. Access *SYSCON → Supervisor Options → Intruder Detection/Lockout.*
2. Type N in the *Detect Intruders* field and press <Enter>.
3. Press <Esc> to exit the form and save your changes.

PRINTING

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Printing

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■ ABOUT NETWORK PRINTING

✓ *If you are using a print server on your network, refer to the print server documentation for information about printing.*

Printing on a network

The path a print job takes to the printer is somewhat different on a network than it is from a local workstation.

Local	Sends directly to a printer attached to the workstation.
Network	Sends to a print queue (subdirectory on fileserver) and then to a printer assigned to the queue.

When a print job is created from within an application, the application usually attaches headers, footers, and internal characters that are useful only to the application.

Before the job can be printed, a print driver for your specific printer must remove or convert these application-specific notations into printer-specific commands, a process that usually occurs automatically.

Once the notation is removed or converted, the print job is *spooled* (data meant for a printer is sent to a file) to a print queue on the file server for temporary storage. Jobs sent by workstations are then printed in the order they are received in the queue unless the order is changed or the job is put on hold by a user or queue operator.

Printers can service several queues or several printers can service a single queue.

Setting up network printing

Most applications spool all print jobs to a print queue. There are two exceptions:

- Older versions of network applications that spool to a printer *number.*
- Applications not designed for networks.

In either case, see "For applications not designed for network printing" on page 78.

For network application. Before jobs can be printed, you must take the following steps.

1. Install the necessary hardware and software for file server and printers. (See the v2.2 *Installation* manuals.)
2. Create print queues with the QUEUE console command or with the PCONSOLE menu utility (p 81).

When a queue is created, NetWare automatically

- — Creates a corresponding directory in SYS:SYSTEM to store print jobs sent to that queue.
- — Assigns user SUPERVISOR as a print queue operator. The supervisor can assign other queue operators (p 87).
- — Assigns members of group EVERYONE as print queue users. This default can be changed (p 86).

3. Define network printers. Use the PRINTER command to initialize each printer port. Specify a printer number (0-4) and a printer type (parallel or serial) for each printer (p 82).
4. Assign queues to printers with the PRINTER command (p 81). These assignments automatically move jobs from the queue to the appropriate printer.
5. Follow the directions in the application's documentation to print files.

For applications not designed for network printing. In addition to the steps above, extra steps are necessary in either of the following situations:

- **Application spools to printer numbers**. If you are using an application that spools to a network printer number rather than to a print queue, you must set up spooler assignments (p 83). The spooler then intercepts these jobs and puts them into the queue.

  Spooler assignments should be saved in the system AUTOEXEC.SYS file (p 85) so that they are set up automatically each time the file server comes up.

- **Application doesn't accommodate queues.** Use NetWare utilities to redirect print jobs to network queues.

  CAPTURE/ENDCAP. Use CAPTURE to reroute the print job from the workstation's parallel port to a print queue.

  For a session. Enter the CAPTURE command at the command line.

  Automatically. Enter the CAPTURE command in system or user login scripts (see p 51 and p 54).

Use ENDCAP to end a CAPTURE session when the print job is finished.

NPRINT. Use NPRINT to redirect application or ASCII text files to a specified print queue. Files must be printer-ready.

For a session. Specify print parameters (p 102) at the command line for each job.

Automatically. Set up standard print job configurations (p 95) and include them in the NPRINT command.

PCONSOLE. Use PCONSOLE menus to select and redirect application or ASCII text files to a specified print queue.

Specify a default print queue for CAPTURE and NPRINT by setting up a spooler assignment (p 83). The default assignment sends print files to whatever queue Spooler 0 is assigned.

Customizing printing for frequently used non-network printing applications

If you frequently use CAPTURE, NPRINT, or PCONSOLE to print files from applications not designed for network printing, you will probably want to set up printing configurations that can be attached to print jobs (rather than specifying a new configuration for each job).

1. Use PRINTDEF to copy or create a database of printer commands (also called print device functions or escape sequences) to use in the configurations.
2. Use PRINTDEF to combine the commands in the database into modes, a sequence of printer commands that tells the printer how to print a job (p 94).
3. Use PRINTCON to create configurations using defined modes and to specify printing parameters such as number of copies, print form, and printer (p 95).

PRINTDEF and PRINTCON are particularly useful in the following situations:

- You are using an application with severely limited print formatting abilities.
- You are having problems resetting the printer to default fonts after using a different printing setup.
- You need to choose among several different forms or print configurations.

■ ADD A PRINTER TO THE NETWORK

Adding a printer to the network requires several steps:

1. Set up the printer hardware. Refer to the printer documentation for instructions. We recommend bringing up the printer at a standalone workstation to make sure it is functioning properly before adding it to the network.
2. Cable the printer to an existing file server printer port.

✓ *If you are installing an add-on printer board in the file server, you must run the setup (or equivalent) program for the computer.*

3. Create the print queues (p 81) the printer will service (unless you will be assigning existing queues to the new printer).
4. Define the printer (p 82).
5. Assign queues to the printer that will service them (p 81).
6. Create spooler assignments (p 83) for the default queue:
   - If you will be using NPRINT and CAPTURE to print files.
   - If your applications send jobs to printer numbers.

■ REMOVE A PRINTER FROM THE NETWORK

1. Type the following at the file server console:

   Printer *n* REMOVE

   Replace ***n*** with the number of the printer being removed.
2. The assignments for all queues currently serviced by the printer are released and the printer definition and resources are deleted from the file server. The queues remain intact and can be reassigned to other printers (p 81).
3. Delete references to the deleted printer from the AUTOEXEC.SYS file (p 85).
4. Disconnect the printer from the file server.

✓ *To temporarily release a queue's assignment to a particular printer without removing the printer from the network, refer to page 83. To permanently delete a queue, refer to page 84.*

■ CREATE PRINT QUEUES

✓ *Queues can also be created with PCONSOLE. See page 84.*

At the file server console, type

Q *QueueName* CREATE

Replace *QueueName* with the name of the new queue.

✓ *User SUPERVISOR is automatically assigned as print queue operator and group EVERYONE as print queue user. To change these defaults, see pages 87 and 86, respectively.*

5. Assign the queue to the printer that will service it. See the next column.

■ ASSIGN QUEUES TO PRINTERS

For a session. Type the command at the file server console. The command is in effect only until the file server is rebooted.

Automatically. Type the command in the AUTOEXEC.SYS file (p 85).

Assign the queue to a single printer

Type the following:

PRINTER *n* ADD *QueueName*.

Replace *n* with the number of the printer (0-4) that will service the queue.

Assign a queue to several printers

Type the following:

PRINTER *n* ADD *QueueName*.

Repeat the command for each printer, replacing *n* in each command with one of the numbers of the printers (0-4) that will service the queue.

Assign several queues to the same printer

In this case, you can also set a priority level for each queue. Type the following:

PRINTER *n* ADD *QueueName* [[AT] [PRIORITY] *nn*]

Repeat the command, as necessary, to assign additional queues to the same printer, substituting the new queue name and a new priority number (1, 2, and so on).

■ DEFINE A PRINTER

For a session. Type the command at the file server console. The command is in effect until the file server is rebooted.

Automatically. Type the command in the AUTOEXEC.SYS file (p 85).

Type the following:

Printer *n* CREATE *port*

Replace *n* with a printer number (0-4) and *port* with LPT*x* for parallel or COM *x* for serial.

The following default configuration is installed for COM ports:

Baud	9600	Parity	None
Word Size	8	Xon/Xoff	No
Stop Bits	1	Poll	15

If this configuration is not suitable for your printer (check the printer documentation), refer to "Reconfigure a serial printer" in the opposite column.

■ RECONFIGURE A SERIAL PRINTER

If network serial printers use different parameters (check the printer documentation) than the default (see the opposite column), change the conflicting parameters. Type the following command at the file server console. Enter parameters in any order.

Printer *n* CONFIG [BAUDRATE=*x*] [WORDSIZE=*x*] [STOPBITS=*x*] [PARITY=*x*] [XonXoff=*x*] [Poll=*x*]

Replace the variables with the values listed below.

Option	Valid values
Baud rate	110, 150, 300, 600, 1200, 2400, 4800, 9600
Word size	7 or 8 (bits)
Stop bits	1 or 2 (bits)
Parity	None, even, or odd
Poll	1 to 60 (seconds server waits between checking queues for print jobs)

■ TEMPORARILY REMOVE A QUEUE FROM SERVICE

To temporarily remove a queue from a printer's service, type the following at the file server console:

P *n* DEL *QueueName*

Replace ***n*** with the number of the printer the queue is assigned to and *QueueName* with the queue's name. The following are in effect:

- All jobs already in the queue are saved.
- Print jobs can still be sent to the queue.
- Jobs in the queue or sent to the queue after service is disabled will not be printed until you reassign the queue to a printer (p 81) or, if assignments are automatic, until the server is rebooted.

■ CREATE A DEFAULT SPOOLER ASSIGNMENT (Optional)

Spooler assignments have two functions:

- To set up default print queues for NPRINT and CAPTURE. Spooler 0 is the default spooler. If spooler 0 or another default is not defined, the print job disappears.
- To support applications that send print jobs to printer numbers rather than print queues.

✓ *Older versions of NetWare create spooler assignments automatically. NetWare v2.2 does not.*

We suggest that you create at least one spooler assignment for NetWare print utilities to use as a default. Then, if a user prints with NPRINT and CAPTURE and does not specify a queue name in the command, the job will still print via the default queue.

For a session. Type the command at the file server console. The command is in effect until the file server is rebooted.

Automatically. Type the command in the AUTOEXEC.SYS file (p 85).

Type the following:

SPOOL 0 *QueueName*

Replace *QueueName* with the name of a queue on your network.

■ VIEW, CREATE, DELETE, OR RENAME PRINT QUEUES

View existing print queues on the current server

1. Access PCONSOLE → *Print Queue Information* to list existing print queues.

✓ *A printer's queues can also be listed* at the file server console. Type **P** ***n*** **Queues** and press <Enter>.

Create print queues

✓ *Queues can also be created at the file server console. See "Create print queues" on page 81.*

2. Press <Ins> and type the name of the new print queue.
3. Press <Enter> and exit PCONSOLE.

Once created, a print queue must be assigned to a printer (p 81).

Rename print queues

2. Highlight the queue being renamed.
3. Press <F3> (Modify) and delete the old name.
4. Type in a new name and press <Enter>.
5. Modify the name of the print queue in assignments saved in the AUTOEXEC.SYS file (p 85).

Delete queues permanently

2. Highlight or mark the print queues to be deleted.
3. Press <Del> and confirm the deletion.

✓ *Queues can also be deleted at the file server console. Type*

Q ***QueueName*** **DESTROY**

4. Remove any related assignments from the AUTOEXEC.SYS file (p 85).

■ VIEW, CREATE, OR EDIT THE AUTOEXEC.SYS FILE

View the current AUTOEXEC.SYS file

1. Access *SYSCON* → *Supervisor Options* → *Edit System AUTOEXEC File* to view the current AUTOEXEC.SYS file, if any.

✓ *When the file server comes up, it looks for an AUTOEXEC.SYS file. If the file exists, the file server follows the directions in the file to set up spooler and queue assignments. If the file does not exist, you must reassign queues to printers at the file server console each time the file server is downed and brought back up.*

Create an AUTOEXEC.SYS file

2. Type the following suggested commands for each printer and queue:

Printer *n* CREATE *Port*	Printer Definition (p 82)
Printer *n* ADD *QueueName*	Queue/printer assignment (p 81)
SPOOL 0 *QueueName*	Spooler assignment (p 83)

3. Press <Esc> and then <Enter> to save the file.

✓ *You can also create the file with a text editor.*

Edit the AUTOEXEC.SYS file

2. Delete unnecessary assignments.
3. Type in the new assignments.
4. Press <Esc> and confirm the changes you've made.

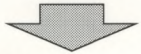
✓ *You can also edit the file with COPY CON or another text editor.*

■ VIEW, ASSIGN, OR REMOVE PRINT QUEUE USERS

View authorized print queue users

1. Access PCONSOLE → *Print Queue Information*.
2. Select a print queue and then select *Queue Users*. Print queue users are displayed.

✓ *By default, all users, as members of the group EVERYONE, are print queue users. To restrict the use of the queue, delete EVERYONE as a print queue user and assign new queue users.*



Assign print queue users

3. Press <Ins>. A list of users and groups is displayed.
4. Select (or mark) the users or groups to be assigned as queue users.

Remove print queue users

3. Highlight (or mark) one or more users or groups.
4. Press <Del> and confirm the deletion.

■ VIEW, ASSIGN, OR REMOVE PRINT QUEUE OPERATORS

View currently assigned operators

1. Access PCONSOLE → *Print Queue Information.*
2. Select a print queue and then select *Queue Operators* to list currently assigned operators.

✓ *By default, SUPERVISOR is assigned as the print queue operator; others can be assigned. Operators can edit other users' print queue entry information, delete entries, modify the queue's status, or change the printing order.*

Assign print queue operators

3. Press <Ins> to list users and groups.
4. Select (or mark) the users or groups to be assigned operator status.

Remove print queue operators

3. Highlight (or mark) the users or groups to be deleted.
4. Press <Del> and confirm the deletion.

■ CONTROL JOBS IN A PRINT QUEUE (With QUEUE)

List all print queues

At the file server console, type **QUEUE.**

List jobs in a print queue

At the file server console, type Q QueueName JOBS. A screen appears listing the jobs in the queue, the job numbers, the priority of the jobs, and the users who sent the jobs to the queue.

Delete jobs

From the file server console, do one of the following:

— To delete a single job, type

Q *QueueName* DEL [JOB] *xx*

— To delete all jobs in the queue, type

Q *QueueName* DEL *

Change the printing order of a job

Type the following at the file server console.

Q *QueueName* CHANGE JOB *nn* TO *nn*

Replace the first ***nn*** with the current number of the job. Replace the second ***nn*** with the position you want the job moved to.

If you specify a position greater than the total number of jobs in the queue, the specified job moves to the end of the queue.

■ CONTROL JOBS IN A PRINT QUEUE (With PCONSOLE)

All print queue users can obtain information about jobs, add jobs, and delete and place holds on their own jobs. Print queue operators can also delete or change the order of jobs in the queue and change the operator flags.

View the jobs in a print queue

1. Access PCONSOLE → *Print Queue Information.*
2. Select a print queue and then select *Current Print Job Entries.* Jobs currently in the queue are listed.

Delete jobs

3. Highlight (or mark) the jobs to be deleted.
4. Press <Del> and confirm the deletion.

Place or release a hold on a job

3. Highlight or mark one or more jobs.
4. Press <Enter> and highlight *User Hold* or *Operator Hold.*
5. Type Y to place a hold or N to release a hold and then press <Esc>.

Change the order of a job

3. Select the appropriate job.
4. Highlight *Service Sequence* and type a new sequence number.
5. Press <Esc>. The job will be printed in the sequence you specify.

■ CONTROL THE PRINTER

Stop and restart a printer

If it is necessary to service the printer, type the following command at the file server console.

P *n* Stop

Printing will be interrupted as soon as the print buffer is empty.

To restart the printer, type

P *n* Start

Printing resumes at the point at which it was interrupted.

Reprint part or all of current job

To interrupt the printing process to reprint all or part of the current print job, type the following at the file server console:

P *n* REWIND [*xx*]

Replace ***n*** with the printer number and ***xx*** with the number of pages you want the printer to back up (10 pages maximum).

- To reprint the last four pages, replace ***xx*** with 4.
- To start printing at the top of the current page, replace ***xx*** with 0.
- To start printing at the beginning of the job, do not specify a value for ***xx***.

As soon as the printer buffer is empty, the printer rewinds and reprints the pages.

Change form mounted in printer

Form numbers are assigned by the network supervisor with PRINTDEF (p 92). If a user specifies a print form that is not mounted in the printer, an error message appears at the file server console.

To change the form mounted in the printer, type the following at the file server console.

P *nn* FORM *xx* MOUNTED

If you frequently use several different forms, consider mounting a different form in each printer. Then have users select the printer that has the needed form already mounted.

Align printed forms

Use the MARK feature in combination with FORM FEED to adjust the printing position on a page. At the file server console, type

PRINTER *nn* FORM MARK

The specified printer will print a row of asterisks on the first form, showing the print position. Use the asterisks to adjust the form in the printer, stopping the printer if necessary (p 90), so that information prints where you want it.

Advance the printer one page by typing

PRINTER *nn* FORM FEED

The FORM FEED command functions even if you have stopped the printer to reposition the form. When you have adjusted the print position to your liking, restart the printer (p 90).

The printer should now be ready to position continuous-feed forms properly.

Display a printer's configuration

From the file server console, do one of the following:

— To list the configuration for a single printer, type

PRINTER *n* CONFIG

— To list the configurations for all printers, type

PRINTER *

List a printer's queues

To list the queues serviced by a particular printer, type the following at the file server console.

P *nn* QUEUES

A screen appears listing the queues, the printer's status (on- or off-line), the form mounted in the printer, and the priority level of the queues the printer is servicing.

List the printer's status

To list the status of all printers attached to the file server, type the following at the file server console:

PRINTERS

■ DEFINE PRINTER DEFINITION FILES (Optional)

For standard printers (defined by NetWare)

NetWare loads standard print device definitions (.PDF files) into SYS:PUBLIC during installation. These files can be copied into a PRINTDEF database and used to create print configurations (p 95) to use with applications that don't support network printing.

✓ *If a .PDF file does not exist for your printer, you can import an existing printer definition from an attached file server (see the opposite column) or create one (see page 93).*

1. Access *PRINTDEF → Print Devices → Import Print Device.*
2. Press <Enter> to display a *Source Directory* entry box.
3. Change to SYS:PUBLIC (p 6), press <Enter>, and select the .PDF file that corresponds to your printer. You are returned to the *Print Device Options* window.
4. Press <Esc> twice and select Yes to exit PRINTDEF; then select *Save Data Base,* and then *EXIT.*

Copy printer definitions from another file server

1. Export the definition from PRINTDEF on the source server to a file.
   - — At the source file server, access *PRINTDEF → Print Devices → Export Print Device* and select the definition to be copied.
   - — Press <Enter> and type or insert (p 6) a path to a directory on either the source or destination file server.
   - — When the path is complete, press <Enter>, type a name for the new file, and again press <Enter>. The file is created, given a .PDF extension, and placed in the specified directory.
2. Import the .PDF file into PRINTDEF on the destination file server.
   - — At the destination server, access *PRINTDEF → Print Devices → Import Print Device.*
   - — Press <Enter>, type or select the directory you exported the file to, press <Esc> and then <Enter>.
   - — Select the file. Press <Escape> twice and select Yes to exit PRINTDEF; then select *Save Data Base, and then EXIT.*

For nonstandard printers (not defined by NetWare)

Definitions for printers not supported by NetWare (no .PDF file exists) can be added to the PRINTDEF database and used to create print configurations (p 95) to use with applications that don't support network printing.

1. Access *PRINTDEF* → *Print Devices* → *Edit Print Devices*.
2. Press <Enter> to access the *Defined Print Devices* list.
3. Press <Ins>, type a name to identify the file (usually the name of your printer), and press <Enter>. The name is added.
4. Highlight the name and press <Enter>.
5. Select *Device Functions*. (Your printer's name replaces *Device*.)
6. Type the commands (escape sequences) on the form provided.
   - — Consult the printer's documentation to locate the print commands you need (the reset command is necessary; others are optional).
   - — Press <Ins>, type a name that describes one of the print commands (boldface, for example), and press <Enter>.
   - — Type the command, including angle brackets, exactly as it appears in the printer documentation. Press <Esc> twice and confirm the changes; then press <Enter>.
7. Repeat Step 6 to add additional commands to the file.

✓ *In most cases, commands can be placed at the end of the list; however, the order may be important to some printers. Check the printer documentation.*

■ VIEW, DEFINE, OR DELETE PRINTER MODES

Printer commands (p 92) can be combined into "modes" (sequences of print functions that tell the printer how to print a particular job). Modes are then combined into configurations (p 95) and included in CAPTURE, NPRINT, and PCONSOLE print commands.

View printer modes

1. Access *PRINTDEF* → *Print Devices* → *Edit Print Devices*. Defined printers are listed.
2. Select the printer whose modes you want to view, define, or delete and then select *Device Modes*. Currently defined modes are listed.

✓ *If you are creating modes for nonstandard (p 93) printers, a reinitialize mode (used to reset the printer) must be defined (the reinitialize mode will already appear if you are using a standard printer); defining other modes is optional.*

Define the "reinitialize" mode (for nonstandard printers)

3. Press <Ins>, type a descriptive name for the new mode, and press <Enter>.
4. Press <Ins> again and highlight (or mark) the reset commands and press <Enter>.
5. Press <Esc> and confirm the changes.

Define other modes

3. Press <Ins>, type a descriptive name for the new mode, and press <Enter>.
4. Press <Ins> and highlight or mark the commands to be included and press <Enter>.
5. Press <Esc> and confirm the changes.

Delete a mode

3. Highlight the mode to be deleted and press <Del> and confirm the deletion.
4. Press <Esc> and confirm the changes.

■ VIEW, DEFINE, EDIT, OR DELETE PRINT JOB CONFIGURATIONS

Print configurations that specify how a file will be printed can be attached to jobs printed with CAPTURE, NPRINT, and PCONSOLE. If you don't use these utilities to print, you don't need to create configurations; most applications "configure" their own print files.

✓ *The first configuration defined is the default and is used if no configuration is specified in the print command.*

View defined configurations

1. Access *PRINTCON* → *Edit Print Job Configurations* to list currently defined configurations.

Define a configuration

2. Press <Ins>, type a descriptive name, and press <Enter>. A form appears, listing default print parameters.
3. Select any fields that need to be changed and type (or select) new parameters.
4. Press <Esc> and confirm the changes.

Edit a configuration

2. Highlight the configuration to be edited and press <Enter>. A form appears, listing current parameters.
3. Select fields that need to be changed and type (or select) new parameters.
4. Press <Esc> and confirm the changes.

Delete a configuration

2. Highlight the configuration to be deleted and press <Del>.
3. Press <Esc> and confirm the changes.

✓ *The default configuration cannot be deleted.*

■ SELECT A DEFAULT PRINT CONFIGURATION

The default print job configuration controls the printing of files printed with NPRINT, CAPTURE, or PCONSOLE. Consider the following:

- The default configuration is used if no configuration (Job=*Name*) is specified in the print command.
- The first configuration created is the default unless otherwise specified.
- Flags and options entered at the command line override the default configuration.

1. Access *PRINTCON* → *Select Default Print Job Configurations*.
2. Select the configuration you want to be the default. The word *default* appears to the right of the selected configuration.
3. Press <Esc> twice, select Yes to exit PRINTCON, and then select Yes to save the configuration.

■ COPY A PRINT CONFIGURATION

NetWare creates a print job configuration file (PRINTCON.DAT) for each user and stores the file in the user's mail directory. The SUPERVISOR can copy the file (but not individual configurations) from one user to another. Check with the target user first, since the copied file overwrites the user's existing file.

1. Access *PRINTCON* → *Copy Print Job Configurations*.
2. Type the name of the user whose file you want to copy in the *Source User* entry box and press <Enter>.
3. Type the name of the user you are copying the file to in the *Target User* entry box and press <Enter>.
4. Press <Esc> to exit.

■ VIEW, DEFINE, EDIT, OR DELETE PRINT FORMS

Most applications designed for networks include options to set up print forms. Use the instructions below when these options are missing or when you print with NPRINT, CAPTURE, or PCONSOLE. A print form can be specified as part of a print job configuration (p 95).

View defined print forms

1. Access *PRINTDEF → Forms.*

Define a print form

2. Press <Ins>, type a descriptive name for the new form, and press <Enter>.
3. Specify the following, pressing <Enter> after each.
   —A form number (0-255). (Form 0 is the default unless otherwise specified.)
   —A form length in lines per page.
   — A form width in characters per line
4. Press <Esc> and confirm the changes.

Edit a print form definition

2. Select the form to be edited and press <Enter>. A form appears, listing current parameters.
3. Highlight any field that needs to be changed, type the change, and press <Enter>.
4. Press <Esc> and confirm the changes.

Delete a print form definition

2. Highlight the form to be deleted.
3. Press <Del> and confirm the deletion.

■ PRINT FILES

Most applications designed for use with network printing recognize print queues and send files to the printer using options within the application. When this is not the case, use NetWare print utilities (NPRINT, CAPTURE, and PCONSOLE) to print files.

Print files with PCONSOLE

1. Select a print queue.
   - — Access *PCONSOLE → Print Queue Information.*
   - — Select a print queue and then select *Current Print Job Entries.*
2. Select the file to be printed.
   - — Press <Ins>; type the path to (or select) the directory the file is in; press <Enter>.
   - — Select (or mark) the files to be printed. The *Print Job Configurations* window appears, listing a default and any configurations set up with PRINTCON (p 95).
3. Define the way the job will be printed.
   - — Select a configuration and use the Arrow and Enter keys to highlight and select options.
   - — Change options as necessary.

✓ *Options are explained on page 102.*

   - — Press <Esc> and confirm the changes. Your job will be printed.

Print files with NPRINT

To print DOS text files or files that have been formatted by an application for your specific printer, type

NPRINT *DirectoryPath* [*option ...*]

Replace *DirectoryPath* with the filename (if in default directory), with a drive letter (such as F:) and the filename, or with a complete path (including the filename).

✓ *Options are explained on page 102.*

Print files with CAPTURE

1. Before you enter an application, type

   CAPTURE [*option...*]

✓ *To print from an application without exiting it, include the TI option (see page 107).*

2. Enter the application and create or access the file to be printed.
3. Print the file using the print keys for the application. CAPTURE routes the job to the default print queue of your file server.
4. Exit the application.
5. Return to the DOS prompt and end the capture session by typing

   ENDCAP

Print screen displays with CAPTURE

1. Before you access the screen, type

   CAPTURE [*option...*]

✓ *Options are explained on page 102.*

2. Access the screen to be printed.
3. Press <Shift-PrintScreen>.
4. Repeat Steps 2 and 3 to print additional screens.
5. Return to the DOS prompt and end the capture session by typing

   ENDCAP

Save screens to a network file with CAPTURE

1. Before you access the screens, type

   CAPTURE CR=*DirectoryPath*

✓ *To save screens from several files to the same network file, include the NA option. Other CAPTURE options (except* **SH***ow) can also be included.*

2. Access the screen to be printed.
3. Press <Shift-PrintScreen>.
4. Repeat Steps 2 and 3 to save addi tional screens to the file.
5. Return to the DOS prompt and end the capture session by typing

   ENDCAP

■ SUMMARY TABLE OF PRINTER COMMANDS

Console printer commands	Explanation
P[RINTER] HELP	Lists printer commands available at the file server console.
P[RINTER] *nn* CREATE *device nn*	Creates a printer process (replace *device* with port: LPT or COM).
P[RINTER] *nn* REMOVE	Removes a printer process.
P[RINTER] *nn* CONFIG	Displays a printer's configuration.
P[RINTER] *nn* STOP	Stops printer temporarily.
P[RINTER] *nn* START	Restarts stopped printer.
P[RINTER] *nn* MOUNT FORM *xx*	Mounts specified form on printer.
P[RINTER] *nn* REWIND *xx* [PAGES]	Rewinds printer pages.
P[RINTER] *nn* FORM FEED	Advances paper one page to help position forms.
P[RINTER] *nn* FORM MARK	Prints asterisks to help align forms.
P[RINTER] *nn* POLL *x*	Sets printer polling period

P[RINTER] *nn* ADD [QUEUE] *name* [[AT] [PRIORITY] *nn*]	Adds queue to printer. Changes queue priority.
P[RINTER] *nn* [Q[UEUE[s]]]	Lists queues the printer services.
P[RINTER] *nn* DEL[ETE] [QUEUE] *name*	Removes a queue from service temporarily.
P[RINTER] *nn* POLL *xx*	Sets printer polling period.
P[RINTER[S]]	Lists printer status.
Q[UEUE[S]]	Lists all print queues.
Q[UEUE] *name* [JOB[S]]	Lists all print jobs in the queue.
QUEUE] *name* D[EL[ETE]] JOB *nn* /*	Deletes given or all (/*) jobs in the specified queue.
Q[UEUE] *name* C[HANGE] [JOB] *nn* [TO] [PRIORITY] *xx*	Changes printing order.
Q[UEUE] *name* CREATE	Creates a queue with the specified name.
Q[UEUE] *name* DESTROY	Destroys the named queue and all jobs in the queue.
S[POOL]	Displays the file server's spool assignments.
S[POOL] *nn* [TO][QUEUE] *name*	Redirects spool jobs to a specified queue.

■ NETWARE PRINTING PARAMETERS

Printing parameters (options) can be specified in the following ways:

- At the command line each time a CAPTURE or NPRINT command is entered
- With a configuration (created with PRINTCON) and attached to a file printed with CAPTURE or NPRINT
- From a PCONSOLE menu

Jobs printed with CAPTURE and NPRINT are printed according to the default print job configuration defined in PRINTCON (p 96) unless you specify otherwise.

Some commands that accomplish the same purpose have slightly different formats (**C**opies=*n* and Number of copies, for example). Where this is the case, the commands are grouped in the alphabetical listing with the command line format (CAPTURE, ENDCAP, or NPRINT) listed before the menu format (PCONSOLE and PRINTCON).

The chart on the next several pages summarizes NetWare printing parameters. Not all parameters are available with every utility. If you are entering options at the command line with CAPTURE, ENDCAP, or NPRINT, do the following:

- Type only the boldface portion of the option.
- Separate multiple options with a space or a comma.
- Replace variables (items in italics) with information specific to your network.

Options	NPRINT	CAPTURE	ENDCAP	PRINTCON	PCONSOLE	Explanation
Banners						
Banner=*banner name*	■	■				Determines whether a banner (preliminary page identifying the file) will be printed.
NoBanner	■	■				If so, prints a banner name (12-character maximum) on the lower half of the page.
Print banner				■	■	
Banner name				■	■	Overrides the default login username (12-character maximum).
NAMe=*name*	■	■				Prints text (filename) on the upper part of the banner (12-character maximum).
Banner file name				■	■	Overrides the default filename (12-character maximum).
Description					■	Identifies the file being printed (default = filename.)
Capture, enable						
Local=*nn*	■	■				Indicates which local LPT ports to capture.

Options continued	N	C	E	P	PC	Explanation
Capture, cancel						
ALL			■			Ends capture of all LPT ports.
Cancel			■			Ends capture and discards data.
Cancel**L**ocal=*n*			■			Ends capture of specified LPT port and discards data.
Cancel **ALL**			■			Ends capture of all ports and discards data.
Local=*n*			■			Indicates which local LPT ports to release (ends LPT capture).
Copies						
Copies=*n*	■	■				Specifies how many copies to print.
Number of copies				■	■	
Files						
Delete	■	■				Erases a file after it is printed.
CReate=*path*	■					Creates file and saves captured data to it.
Keep	■					Saves and prints all captured data if workstation loses power during a capture.

Form feed					
Form**F**eed	■	■			Determines whether form feed is enabled or suppressed. If enabled, form is advanced so printing begins at the top of the next page (inserts a blank page if application has automatic form feed).
No**F**orm**F**eed	■	■			
Suppress form feed			■	■	
Forms, print					
Form=*form* or *n*	■	■			Specifies which form (p 97) to print on.
Form name			■	■	
Holds					
User hold				■	Delays printing until user or print queue operator releases hold.
Operator hold				■	Delays printing until operator releases hold.
Job, configuration					
Job=*job configuration*	■	■			Attaches a print job configuration (p 95) to the print job.
Mode			■		Attaches a mode (p 94) to the print job.

Options continued	N	C	E	P	PC	Explanation
Job, configuration (cont.)						
File contents				■	■	Specifies how the data will be printed. Text — Formatting characters, such as tabs, are interpreted by printer. (Choose *Text* to print ASCII text.) Byte Stream — Formatting characters are interpreted by the application. (Choose *Byte Stream* if printing from within an application.)
Job, routed to						
Server=*fileserver*	■	■				Identifies which file server job is sent to.
File server				■		
Queue =*name*	■	■				Identifies which queue print job is sent to. Queue must be mapped to the server you specify.
Print queue				■		
Local Printer				■		(Use only with CAPTURE.) Indicates which local LPT port to capture.
Device				■		Specifies the printer a job is sent to. Printer (device) must be assigned to queue specified.

Print**S**erver=*name*	■	■				Names the print server servicing the job.
Target server					■	
Job, when to print						
Autoendcap	■					Determines when data from an application is sent to a network print queue (or file).
NoAutoendcap	■					A or N Data sent to print queue as you exit.
Auto endcap				■		NA or N Data won't be printed until ENDCAP is issued or Timeout elapses.
TImeout=*n*	■					Sends data to printer a specified number of seconds after application last writes to file.
Enable timeout				■		(Use only with CAPTURE.) Determines when captured data is sent to print queue. Y Data sent to queue after number of seconds defined in Timeout count. N Data is printed according to the setting in the *Auto endcap* field.
Timeout count				■		(Use only with CAPTURE.) Specifies number of seconds before data is sent to print queue. Not needed if ENDCAP is used.
Defer printing					■	Delays printing until the time specified in *Target date* and *Target time*.
Service sequence					■	Positions the print job among others in the queue. Must be set by print queue operator.

Options continued	N	C	E	P	PC	Explanation
Notify user						
NOTIfy	■	■				Determines whether user is notified when job is printed.
No**NOTI**fy	■	■				
Status						
SHow	■					Shows the current status of local LPT ports. Can't be used with other options.
Tabs						
Tabs=*n*	■	■				Determines the number of spaces between tabs (include if application does not have a
Tab size				■	■	print device driver; most do).

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This section summarizes most file server and hard disk tasks that you may be performing after the network has been installed. For additional information about tasks, consult the Master Index.

Many of these tasks pose considerable risk to your network. We recommend backing up data before beginning so that you don't run the risk of losing critical information.

Use working copies of the installation diskettes called for. In some cases, you will be prompted to use one of the INSTALL parameters (INSTALL -F, INSTALL -L) to move to a specific form within the INSTALL program. Change the forms as needed (scroll down to see parts of the forms below the screen) and then update your network by confirming the items (NetWare tracks needed software changes as you change the forms) on the "Tasks to be performed" list.

■ VIEW INFORMATION ABOUT LOGGED IN USERS

To view	Type or access
Object type	FCONSOLE→ *Connection Information*. Select a user; then select *Other Information*.
Login time	FCONSOLE→ *Connection Information*. Select a user; then select *Other Information*. USERLIST /A
Connection number	USERLIST /A
How long logged in	FCONSOLE→ *Connection Information*. Select a user; then select *Usage statistics*.
Network address	FCONSOLE→ *Connection Information*. Select a user; then select *Other Information*. USERLIST /A
Node (workstation) address	USERLIST /A
Read/Write requests made	FCONSOLE→ *Connection Information*. Select a user; then select *Usage statistics*.
Files currently using	MONITOR or FCONSOLE
File locks held	MONITOR or FCONSOLE or CONFIG (enter CONFIG at the file server console).

■ OBTAIN INFORMATION ABOUT THE FILE SERVER AND NETWORK

** Commands preceded by an asterisk must be entered at the file server console.*

To view	Type or access
Date/time on server	*TIME
Date/time on attached servers	*SYSTIME FileServer*
Server's name	*NAME
Servers on internetwork	SLIST
Server's network address	SLIST *FileServer*
Server's node address	SLIST *FileServer*
Version of file server, NETBIOS, IPX, SPX, LAN driver, shell	NVER
Version of NetWare utility	VERSION *[Directory Path] UtilityName*
Version of all NetWare utilities (current directory)	VERSION *.EXE
Status of attached workstations	*MONITOR
VAPs loaded	*VAP
Networks known to server	*DISPLAY NETWORKS
Other servers known to server	*DISPLAY SERVERS
Network address	*CONFIG
Hardware type	*CONFIG
IRQ, I/O, and DMA settings	*CONFIG
Service processes available	*CONFIG

■ MONITOR SERVER ACTIVITY

FCONSOLE tracks and summarizes file server activity since the file server was last brought up.

Access *FCONSOLE → Statistics → Summary.*

Items that have implications for your server are discussed briefly below. As a general rule, if the "Peak Used" amounts approach the "Maximum" boundaries (set during installation), reconfigure the boundary.

Number of [Available] File Service Processes. When the file server becomes so busy that processes are not available, service requests are stored in buffers (see "Communication Buffers" below) until they can be handled. If the number available is frequently low (only 4 or 5; 10 is the maximum) and requests stored in routing buffers are changing faster than once every 5 seconds, consider adding an additional server.

Current Server Utilization. It is normal for this value to fluctuate and occasionally be high. However, if utilization is frequently 80% or higher, you may need to move some of the work to another server. Large database files affect this statistic greatly.

Disk Requests Serviced From Cache. Ideally, requests should be serviced from cache memory because it's faster. If this statistic is frequently below 80%, consider adding memory.

Total Number of Cache Buffers/Dirty Cache Buffers. Dirty buffers contain data that needs to be written to the hard disk. If the number of dirty buffers is frequently above 50% of those available, consider adding memory.

Total Server Memory/Unused Server Memory. Subtract the "Unused Server Memory" (fragmented memory that can't be used) from the "Total" to determine how much installed memory is usable.

Communication Buffers. Communication buffers store incoming packets when no file service processes are available. If the maximum number of buffers is reached, packets are discarded. Since communication buffers take little memory, add buffers if the file server is running out.

Open Files. For each open file, the file server sets aside an amount of memory in the "Dynamic Memory 2" pool. Don't specify so many open files (p 124) that the remaining memory is insufficient for other memory requirements, nor so few that users can't open the files they need. The ideal is to arrive at a tight ratio between the "Maximum" and "Peak Used" columns.

Indexed files. Retrieving large database files is quicker if the files are indexed (see "Assign File Attributes" on page 69). Indexing, however, requires a significant amount of memory. The ideal is to arrive at a tight ratio between the "Maximum" and "Peak Used" columns. Reconfigure the maximum number of indexed files, if necessary (p 124).

Bindery Objects. If you decide not to limit disk space (p 125), the number of bindery objects is not limited. Otherwise, the number should be proportional to the number of users on the server. Reconfigure the maximum allowed (p 125) if the maximum is frequently reached.

Connections. The number of connections is fixed by the type of operating system and can't be reconfigured.

Dynamic Memory1. The file server allocates memory to this pool for servicing file server requests. If the pool is running out of memory, you may need to add service processes to the SERVER.CFG file, unload VAPs that use file service processes, or upgrade to NetWare 386.

Dynamic Memory 2. The file server allocates memory to this pool to use for open and indexed files and file and record locks. Add memory to the pool by increasing the number of indexed and open files (p 124).

Dynamic Memory 3 and 4. These pools track server and routing information and directory and drive mappings. Neither can be configured.

If the file server is running out of memory in pool 4, limit the number of users who access applications that create temporary drive mappings (maximum:100 users with 40 drive mappings each).

■ EVALUATE CACHE STATISTICS

FCONSOLE tracks and summarizes cache statistics since the file server was last brought up.

Access *FCONSOLE* → *Statistics* → *Cache Statistics.*

Counters in the file server track the items listed on the "Cache Statistics" screen. Items that have implications for your server are discussed below.

Cache Buffer Size. Large buffers (4,096 bytes) generally provide better performance.

Cache Hits and Misses. If the "Cache Misses" count is frequently high, make sure you have enough buffers to handle the work load. Add buffers by adding memory.

Dirty Cache Buffers. If the number of dirty buffers is frequently above 50% of those available, consider adding memory. If the number of dirty buffers remains constant, disk I/O problems may be indicated

Physical Read and Write Errors. These items indicate the number of times a request couldn't be completed and are an early warning that a hard disk has problems. You may need to do a low-level format of the disk. Low-level formatting erases all data and NetWare information. Proceed with caution.

Thrashing Count. If a requested cache buffer isn't available, the file server keeps trying to allocate one and the thrashing count increments. Ideally, the count should be zero (0). Thrashing seriously degrades server performance. If the thrashing count is one or higher, consider adding memory to increase the number of buffers.

LRU Block Was Dirty. If a cache buffer is needed and the least-recently-used buffer (LRU) is dirty, this count increments. While this situation occurs under the best of circumstances, consistently high counts indicate a need for additional memory.

■ MONITOR FILE ACTIVITY

Use FCONSOLE to determine whether memory allocated to file creation can be better used elsewhere.

Access *FCONSOLE → Statistics → File System Statistics.*

Most items in the display are informational (press <F1> for a description). Two items should be monitored periodically.

Monitor open and indexed files

When the file server is configured to allow a certain number of open or indexed files, NetWare automatically allocates part of the file server's memory to "Dynamic Memory Pools" that are held in reserve for the files and for the File Allocation Tables necessary to track them.

If you specify more open or indexed files than your system needs, memory that could be used elsewhere is unavailable because it is being held in reserve in memory pools.

The ideal is to arrive at a tight ratio between the *Maximum* and *Peak Used* columns. If this is not the case, consider reconfiguring the maximum (p 124).

Monitor FAT statistics

File Allocation Tables (FATs) list pointers indicating which disk blocks contain a file's data. Two FATs are maintained. If one of the areas storing FATs fails, the other usually remains operational.

Monitor the following.

FAT Write Errors. When a portion of a disk fails, Hot Fix redirects data to a reliable area. If there are so many errors that Hot Fix is disabled, this count increments. Check for faulty cables, connections, and power supplies, or a failed disk.

Fatal FAT Write Errors. This counter increments when the operating system can't write to either FAT. Check for faulty cables, connections, and power supplies, or a failed disk.

FAT Scan Errors. This counter increments when an internal consistency check fails. If this entry is incremented, call a Novell authorized service representative.

■ VIEW AND MAINTAIN FILE SERVER ERROR LOGS

NetWare tracks errors and unusual conditions related to the file server in the SYS$LOG.ERR file in the SYS:SYSTEM directory.

1. To view the file server's error log, access SYSCON → *Supervisor Options* → *View File Server Error Log*.
2. Scroll through the error log with the Arrow keys.
3. To exit the log, press <Esc> and do one of the following.
   - — Erase the log. Select *Yes*.
   - — Save log data. Select *No*.
   - — Copy log data to a file. To prevent the log from becoming unmanageable, occasionally erase the log or copy the current SYS$LOG.ERR file to a floppy diskette or to another directory (p 23) and then erase the current log.

Unless you rename the copied file, any subsequent copying of SYS$LOG.ERR to the same directory will overwrite previous data.

■ REPAIR THE FILE SERVER BINDERY

Bindery files (NET$BIND.SYS and NET$BVAL.SYS) probably need to be repaired in the following circumstances:

- A user's rights, username, or password can't be changed, deleted, or modified.
- An "unknown server" error occurs during print spooling.
- Error messages referring to the bindery appear on the file server screen.

1. Log in as supervisor, change to the SYS:SYSTEM directory (p 6) and type **BINDFIX**.
2. Follow screen prompts to create new bindery files. A screen message indicates whether the bindery check is "successful."

The original files are given new extensions (.OLD) and retained in case they need to be restored (if BINDFIX is unsuccessful or fails to solve the problem). To restore the original bindery, type **BINDREST**.

■ MONITOR FILE LOCK STATUS

Most multiuser applications automatically lock and unlock a record (a range of bytes) as the record is entered and closed.

Records or files can be

Logged	File is included in a list of files locked as a set.
Locked Sharable	Others can access a file, but not lock it for exclusive use.
Locked Exclusive	Others can't access the file until the update is complete.

Lock status is monitored by NetWare and displayed in FCONSOLE. You can

- Select a user to determine the status of the user's files and locks the user holds.
- Select a file to determine the file's status and any locks any user has on the file.

Monitor logical record Locks

Locks held by a user. Access *FCONSOLE → Connection Information*, select a user (connection), and then select *Logical Record Locks*.

Locks in effect for a file. Access *FCONSOLE → File/Lock Activity → Logical Lock Information* and then type the name of the record you need information about.

In either case, a form appears listing information about existing logical record locks.

Monitor physical record locks

Locks held by a user. Access *FCONSOLE → Connection Information;* select a user; select *Open Files/Physical Records*.

The user's files are listed. Select the file whose lock status you want to check and then select *Physical Record Locks*.

Locks in effect for a file. Access *FCONSOLE → File/Lock Activity → File/Physical Records Information*, type or insert (p 6) the directory path (excluding filename).

When the directory path is correct, press <Enter>, type the name of the file, press <Enter>, and then select *Physical Record Locks*.

■ ENABLE, DISABLE, AND MONITOR TRANSACTION TRACKING

The Transaction Tracking System (TTS) protects database and bindery files from corruption by backing out incomplete transactions.

Activate TTS

Files from applications that store information in records (most databases and mail applications, but rarely word processors) and issue record-locking calls benefit from transaction tracking. For this reason, most applications include transaction tracking in the application software.

If you are using applications that don't provide this feature, TTS can be installed on the file server during installation (TTS is automatically installed on dedicated servers.) Tracking is then activated by flagging a file "Transactional" (see "Assign file attributes" on page 69).

Disable or enable TTS

NetWare automatically disables TTS if insufficient memory is available or if the TTS backout volume is too full. TTS can also be disabled manually. Disabling TTS increases file processing speed but leaves bindery and database files unprotected. Type the following at the file server console to disable or re-enable TTS.

Disable Transactions

or

Enable Transactions

TTS can also be disabled and re-enabled from the *Status* menu in FCONSOLE.

1. Access *FCONSOLE → File Server Status.*
2. Highlight the *Transaction Tracking* field and type *D* (disable) or *E* (enable).

Monitor TTS

The number of transactional files that can be open simultaneously is set with INSTALL. Monitor the peak number to make sure an appropriate limit has been set for your network. Access

FCONSOLE→ Statistics → Transaction Tracking Statistics

If the peak number frequently nears the configured maximum, increase the maximum (p 121).

Change the limit for open transactional files

1. Down the file server, boot DOS v3.0 or above, and insert the *SYSTEM-1* diskette into drive A.
2. At the file server console, type

   Install -F

   The *File Server Definition* screen appears.
3. Select the *TTS maximum transactions* field.
4. Delete the current entry, type the new number, and press <Enter>.
5. Save the changes and exit the form by pressing <F10>.
6. Press <F10> to confirm the items on the *Actions to be Performed* screen. NetWare records the new settings on the appropriate network hard disk. (Or press <Alt-F10> to abort the program.)

Set lock thresholds (optional)

NetWare assumes that applications set and release physical or logical locks to mark the beginning and end of an individual record; some applications, however, use locks for other purposes. When this is the case, users must activate SETTTS before entering an application so that NetWare will ignore initial locks that don't identify records. Type

SETTTS [LogicalLevel [PhysicalLevel]]

Replace *logical level* and *physical level* with the values (0-254) necessary for the application you are using.

✓ *Consult the application's documentation or vendor to determine thresholds.*

You must set a logical level if you set a physical level. Separate values with a space.

To	Type
View current threshold	SETTTS
Disable threshold temporarily	SETTTS D[isable]
Return threshold to default value	SETTTS R[eset]

■ DOWN THE FILE SERVER

At times, it is necessary to take the file server out of service to perform maintenance tasks or to close open files if network problems occur.

With DOWN (at the file server console)

1. To determine which stations have files open, type **MONITOR**.
2. Have users close their files and log out.
3. Type **DOWN**.

✓ *If any files are still open, a warning message appears. Have users close files from their workstations, if possible. Then, type Yes.*

With FCONSOLE (from any workstation)

1. Determine which users have files open by accessing *FCONSOLE → Connection Information.*
2. Have users close their files and log out.
3. *Access FCONSOLE → Down File Server* and confirm the selection.

■ ATTACH TO ADDITIONAL FILE SERVERS

1. List available file servers by typing

   SLIST

2. Attach to another file server by typing

   ATTACH *ServerName* / *UserName*

✓ *Or, simply map a drive (p 34) to the server. You will be prompted for a username and password.*

3. Enter the user's password, as prompted.
4. Map a drive (p 34) to any directories you need to access on the new file server.

✓ *Unless the ATTACH and MAP commands are entered in the login script (p 54) of the user specified, the commands are in effect only until the user logs out. ATTACH must precede the related MAP command in the login script.*

■ ENABLE OR DISABLE FILE SERVER LOGIN

To prevent users from logging in to the file server while you service the server while it is up, disable the login feature.

At the file server console. Type

DISABLE LOGIN

To re-enable login type

ENABLE LOGIN

(If you down the file server, login is automatically re-enabled when the file server is rebooted.)

With FCONSOLE. Access *FCONSOLE → Status*. Type Y or N in the *Allow New Users To Login* field.

■ SWITCH BETWEEN WORKSTATION AND CONSOLE MODES (Nondedicated server)

File server mode. To switch a workstation from workstation (local) mode into console (file server) mode, type the following at the file server console.

CONSOLE

Workstation mode. To switch a nondedicated file server from console to DOS workstation mode, type

DOS

The computer can now be used as a workstation even though it is still functioning as a file server.

■ SET THE DATE AND TIME KEPT BY THE FILE SERVER

At the file server console. To view the time kept by the filer server, type

TIME

To change the date and time, enter **SET TIME** followed by the date, the time, or both as in the following examples:

SET TIME 10/31/90

SET TIME 8:45:17 PM

SET TIME 10/311/90 8:45:17 PM

With FCONSOLE. Access

FCONSOLE → Status

Type the new date or time in the appropriate field and press <Esc>.

■ RECONFIGURE THE FILE SERVER

1. Down the file server, boot DOS v3.0 or above, and insert the *SYSTEM-1* diskette into drive A.
2. At the file server console, type

   INSTALL -F

   The *File Server Definition* screen appears.
3. Select the field you want to change (some entries extend below the screen).
4. Delete the current entry, type the new information, and press <Enter>.
5. Repeat Step 4 to change other fields, as necessary.
6. Save the changes and exit the form by pressing <F10>.
7. Press < F10> to confirm the items on the *Actions to be Performed* screen. NetWare regenerates operating system and file server utilities. (Or press <Alt-F10> to abort the program.) Changes take effect when you reboot the server.

Press <F1> or refer to the entries below and on page 125 for additional information.

Server name. Consider the following:

File Server Name Parameters	
Num of characters	2 - 16
Invalid characters	? * \ / and spaces (first character can't be a period)

Maximum open files

Use FCONSOLE to monitor open file statistics (p 114). If the peak number frequently approaches the maximum or if users are locked out of files because too many files are open, consider increasing this limit.

Open File Parameters	
Number	20 - 1,000
Memory used	100 bytes per open file

Maximum open indexed files

If a file is indexed, the file server stores, in memory, an index of the file's location on the hard disk so that file access is quicker.

Since indexing requires a significant amount of memory, use FCONSOLE to monitor the peak number of opened, indexed files (p 114) so that you can balance speed against memory requirements.

As a general rule, determine how many sizable database files you will be using and set this parameter to that number. Then assign the Indexed attribute (p 69) to the files.

Indexed File Parameters	
Number	0 - 1,000
Memory Used	1,034 bytes per file

TTS backout volume / TTS maximum transactions

See pages120 and 121 for an explanation of transaction tracking.

Limit disk space

Set this parameter to Yes if you intend to limit the amount of disk space available to users.

✓ *Setting this parameter only determines whether disk space can be limited, not how much can be allocated to each user. The amount available to each user must be set separately. See Account restrictions under "Create users" (p 14).*

Maximum bindery objects

Set this parameter only if you decide to limit disk space. To determine how many bindery objects you need, use FCONSOLE to periodically monitor the peak number of bindery objects using your file server. If the peak frequently nears the maximum, increase the value in the *Bindery objects* field.

The number of objects that can be defined is not limited, but the number that can be connected is limited to 100.

Bindery Object Parameters	
Number	500 - 5,000

■ MONITOR FILE STATUS

Status of a user's files

1. Access *FCONSOLE → Connection Information,* select a user, and then select *Open Files/Physical Records.*

   The user's files are listed.

2. Select the file whose status you want to check and then select *File Status.*

Status of a selected file

1. Access FCONSOLE → *File/Lock Activity → File/Physical Records Information;* type or insert (p 6) the directory path (excluding filename).
2. Press <Enter> and type or insert (p 6) the name of the file.
3. Again press <Enter> and then select *File Status.*

■ VIEW LAN DRIVER STATISTICS

Use either CONFIG or FCONSOLE to obtain the following information about LAN drivers installed in the file server:

Network address	Node address
LAN board type	Configuration option

Hardware options (IRQ, Base I/O, and RAM buffer)

With CONFIG

At the file server console, type **CONFIG**

With FCONSOLE

Access *FCONSOLE → LAN Driver Information.*

■ EVALUATE DISK CHANNEL STATISTICS

A disk channel is the communication path between the file server and hard disks. Use FCONSOLE channel statistic tables to

- Avoid setting conflicting addresses if you are installing additional disks and disk drivers.
- Identify problems with the disk channel.

  Access *FCONSOLE → Statistics → Channel Statistics.*

The following information is listed.

Driver type and version

I/O addresses

Shared memory addresses

Interrupts

DMA channel

Channel configuration

The status of the channel is also indicated. The channel may be

Running	Normal condition.
Stopped or Being stopped	NetWare is probably trying to fix a problem. (Hot Fix may be redirecting data from an unreliable area on the disk, for example.)
Nonfunctional	Usually indicates a loose connection or failed disk.

■ EVALUATE DISK MAPPING

Use FCONSOLE disk mapping statistics to

- Summarize information about file server disk drives, pending I/Os, and disk mirroring.
- Identify a faulty disk drive.

  Access *FCONSOLE → Statistics → Disk Mapping Information.*

The status of the disk channel may be

Active	Channel has disk drives that are currently being used.
Unused	No disk drives are installed on the channel.
Failed	Usually indicates faulty cabling or a failed disk.

■ EVALUATE DISK STATISTICS

Use FCONSOLE to summarize the drive information written into memory when the file server is configured with the SETUP (or an equivalent) utility.

Access *FCONSOLE → Statistics → Disk Statistics*.

NetWare tracks the following information about each hard disk:

Disk type and size

Controller type

Channel, controller, and drive numbers

Cylinders, heads, and sectors per track

I/O Error Count

Hot Fix setup and status

Most items in the display are informational. Two items should be monitored periodically.

I/O Error Count. This counter tracks the number of errors that have occurred in writing information to or retrieving it from the hard disk. If the count is being incremented, back up data more often and check the hard disk for problems. Hot Fix takes care of these errors by redirecting data to reliable areas of the disk; however, make sure space is still available in the Hot Fix Redirection Area (see the *Hot Fix Remaining* field). If necessary, increase the size of the Hot Fix Redirection Area (p 138).

Hot Fix Statistics. Hot Fix works with a feature called Read-After-Write Verification. If data written to a disk doesn't match the data in memory, Hot Fix redirects the data to a reliable area.

If a disk has failed and data can't be written to disk, "Disabled" appears in the *Hot Fix* field.

In addition, compare the *Hot Fix Table Size* and the *Hot Fix Remaining* fields frequently to make sure that sufficient space is available to store information rerouted from failed areas of the disk. If necessary, increase the size of the Hot Fix Redirection Area ((p 138).

■ MONITOR DISK STATUS

To monitor the status of network disk drives, type the following at the file server console.

DISK

A display appears, listing each drive by number and providing several columns of information.

cha — Drive channel

con — Hard disk controller board number

drv — Physical drive number

stat — Status of drive. May be

OK. Set for Hot Fix and Hot Fix is functioning.

NO HOT. Set for Hot Fix, but Hot Fix is not functioning.

OFF. Drive is not operating.

M-xx. Set up for mirroring (or duplexing). The number after **M** identifies the other drive in the mirrored pair.

D-xx. Set for mirroring (or duplexing), but drive is "dead." The number after **D** identifies the other drive in the previously mirrored pair.

IO Err — Number of input/output errors (how many times data has been redirected).

Free — Number of available blocks in redirection area.

Used — Number of redirection blocks in use.

To list information about all volumes on the file server, type

DISK *

Drive numbers and information about mirroring, if applicable, are listed.

To list information about a single volume, type

DISK *VolumeName*

The drive number and type and any error or redirection block information are listed.

■ ADD A HARD DISK TO A SERVER

Only experienced installers should perform this task since it poses considerable risk to your network.

If you add a hard disk that hasn't previously been initialized for NetWare, NetWare sets the following defaults.

Hard Disk and Volume Defaults	
Volumes	One per disk
Volume size	Entire disk capacity (up to 255MB)
Volume name	VOL1 (or 2, 3)
Directory entries	4 +1 per 2MB x 128
Directory caching	Yes
Hot fix	Installed (approx. 2% of the disk)
Disk mirroring	Not installed.

To install a hard disk, do the following:

1. Down the file server, turn off the power, and physically install the hard disk. Refer to the hardware documentation for complete instructions. Make sure
   - Driver addresses don't conflict.
   - Disks are terminated properly.
   - You rerun the setup (or equivalent) utility to reprogram disk information if you are installing an internal hard disk.
   - You run DISKSET (or equivalent) to set the host adapter board if the hard disk is external.
2. Boot DOS v 3.0 or above and insert the *System-1* diskette into drive A. Type

   Install -M <Enter>

   Press <Enter> again. The *Operating System Generation* screen appears.
3. If you are adding a new controller, complete Steps 4-6. If not, skip to Step 7.
4. Scroll to the *Channel* section and select the *Disk driver* field under the appropriate channel.
5. Select the option that matches the type of hard disk you installed in Step 1.

✓ *Be cautious. Incorrect information can prevent proper installation and, in extreme conditions, damage a hard disk.*

6. Select the *Configuration option* field and then select a configuration that doesn't conflict with those of other file server hardware.
7. When the form is correct, press <F10>.
8. Press <F10> to confirm the items on the *Actions to be Performed* screen. NetWare relinks and reconfigures the operating system and file server utilities, if required. The *Ztest* screen appears.
9. Determine whether you need to run Ztest (to prepare track 0 for NetWare).

✓ *Ztest destroys all data on the disk. All hard disks sold by Novell, including those in add-on kits for NetWare servers, have been formatted and tested prior to shipment. You do not need to test these disks.*

— Do not run Ztest (NetWare ready stamp appears on disk). Press <Esc> and skip to Step 9.

— Run Ztest (the hard disk doesn't contain needed data; disk has not been initialized for NetWare or you want to start with a clear disk).

   a. Select the disk you want to test and follow screen prompts.

   b. Repeat for other disks, if needed.

   c. When testing is complete, press <F10> to continue.

   The *File Server Definition* screen appears.

10. Check the Hot Fix and volume information and make any necessary changes.

    Refer to the following as needed:

    Modify a disk's Hot Fix size (p 138)

    Set up disk mirroring (p 136)

    Change the volume definition (p 141)

✓ *Make sure the number and size of volumes is correct. Making changes to these parameters later destroys data.*

11. When the form is correct, save the changes and exit by pressing <F10>.
12. Press <F10> to confirm the items on the *Actions to be Performed* screen. NetWare replaces track zero information and reloads file server utilities, if necessary.

■ ADD A HOST ADAPTER TO AN EXISTING NETWORK

Adding a host adapter (disk subsystem) allows you to add additional disk storage. Complete the following steps.

1. Down the file server and turn off the power; physically install the adapter in one of the file server's expansion slots. Refer to the hardware documentation for complete instructions. Make sure
   - Adapter addresses don't conflict with those of other hardware.
   - Adapters are terminated properly.
   - Any controllers the adapter is connected to are addressed and terminated properly.
2. Run DISKSET (or equivalent third-party program) to reset the host adapter board (see "DISKSET" in *Using the Network*).
3. Boot DOS v 3.0 or above and insert the *System-1* diskette into drive A; type

   INSTALL -M <Enter>

   The *Operating System Generation* screen appears.
4. Scroll to the *Channel* section and select the *Disk driver* field under the appropriate channel.
5. Select the option that matches the type of adapter you installed in Step 1.

✓ *Be cautious. Incorrect information can prevent proper installation and, in extreme conditions, damage hard disks.*

6. Select the *Configuration option* field and then select a configuration that doesn't conflict with other file server hardware, usually Option 0 for the first drive (unless interrupts conflict with other hardware), Option 1 for the second, and so on.
7. When the *Operating System Generation* screen is correct, save the changes and exit by pressing <F10>.
8. Press <F10> to confirm the items on the *Actions to be Performed* screen. NetWare relinks and reconfigures the operating system.

   The *Ztest* screen appears.

9. Determine whether you need to run Ztest (to prepare track 0 for NetWare).

✓ *Ztest destroys all data on the disk. All hard disks sold by Novell, including those in add-on kits for NetWare servers, have been formatted and tested prior to shipment. You do not need to test these disks.*

   — Do not run Ztest (NetWare ready stamp appears on disk). Press <Esc> and skip to Step 10.

   — Run Ztest (hard disk doesn't contain needed data; disk has not been initialized for NetWare or you want to start with a clear disk).

      a. Select the disk you want to test and follow screen prompts.

      b. Repeat for other disks, as necessary.

      c. When testing is complete, press <F10> to continue.

   The *File Server Definition* screen appears.

10. Check the Hot Fix and volume information for disks being added and make any necessary changes; refer to the following instructions as needed:

Set up disk mirroring (p 136)

Modify a disk's Hot Fix size (p 138)

Change the volume definition (p 141)

11. When the screen is correct, save the changes and exit by pressing <F10>.

12. Press <F10> to confirm the items on the *Actions to be Performed* screen. (Or press <Alt-F10> to abort the program.) NetWare regenerates the operating system and file server utilities.

■ REMOVE A HARD DISK OR HOST ADAPTER

Only experienced installers should perform this task since it poses considerable risk to your network.

Hard disks and host adapters can be removed from service in two ways:

Physically	Disk hardware is physically removed from the file server (must also be removed logically.)
Logically	NetWare deletes an entry from the Master System Drive table so that the network no longer recognizes the disk even though it is physically present in the server.

Physically remove a hard disk or host adapter

1. Back up as much of the data on the disk as possible.

✓ *Under normal conditions, no data should be lost from a functional disk when it is removed from the network; however, we strongly recommend that you back up files as a precaution.*

You may not be able to copy data from a failed disk, but back up as much of the data as possible before you remove it from the network.

2. Down the file server and physically remove the hard disk or host adapter.

✓ *Be cautious. Even small shocks and bumps can affect disk performance.*

3. Do one of the following:
   - — Controller or host adapter. Rerun DISKSET (or third-party equivalent) to reset hard disk information.
   - — Internal hard disk. Rerun the computer's setup (or equivalent program) to reset the information for the affected controller.

Refer to the next page to logically remove the hard disk or host adapter.

Logically remove a hard disk or host adapter

The process for removing a disk depends on the condition of the disk and whether or not it is the system disk. Refer to the appropriate discussion below.

System disk (disk containing SYS volume). Remove the system disk only if it has failed. The network is not functional without this disk because it contains the operating system, all NetWare utilities, and any information you have stored on the volume.

If your system disk needs to be repaired or replaced, back up as much of its data as possible and then reinstall NetWare on the repaired or replacement disk.

Other disks. If a disk fails or is physically removed from the file server, it must be logically removed as well. You can remove a disk logically without removing it physically, however.

1. Boot DOS v 3.0 or above; insert the *System-1* diskette into drive A and type

   INSTALL -M

   The *Operating System Generation* screen appears.
2. Scroll to the *Channel* section of the screen and select the *Disk driver* field for the hard disk being removed. (Make sure the information on the screen matches the hardware configuration of the disk you are removing.)
3. Press <Del>.

   The hard disk or host adapter is logically removed from service. Corresponding hard disk information, configurations, and volume definitions disappear from the installation screens; however, this information is still intact and will reappear if you reinstall the disk or host adapter.
4. When the form is correct, save the changes and exit by pressing <F10>.
5. Press <F10> to confirm the items on the *Actions to be Performed* screen. NetWare replaces track zero information and reloads file server utilities, if necessary.

■ SET UP OR MODIFY DISK MIRRORING OR DUPLEXING

Only experienced installers should perform this task since it poses considerable risk to your network.

1. **Back up all data before beginning.** If you accidentally mirror the wrong disk, you could overwrite and destroy data.
2. Down the file server, boot DOS v3.0 or above, and insert the *SYSTEM-1* diskette into drive A.

✓ *These instructions assume disks being mirrored are already installed. If not, complete Steps 1-8 under "Add a hard disk " (p 130) and then skip to Step 4.*

3. At the file server console, type

   INSTALL -F

   The *File Server Definition* screen appears.
4. Scroll to the *Hard Disk Information* section of the form.
5. Set the disks you are mirroring to the same logical size.
6. Select *Mirror status* under one of the disks you are mirroring. If the disks are in the same channel, they are mirrored; if in different channels, duplexed. (Duplexing is more reliable since different channels rarely fail simultaneously.)
7. Do one of the following:
   - — Unmirror disks. Select *Not mirrored.*
   - — Mirror disks. Select the *Primary disk* field; delete the number of the currently mirrored disk, if any, and type the reference number for the secondary disk.

     The secondary disk column is updated with the corresponding mirror status and reference number.

✓ *Remember that all data on the secondary disk will be erased and replaced with the data from the primary disk.*

8. When the form is correct, press <Enter>.
9. Save the changes and exit by pressing <F10>.
10. Press <F10> to confirm the items on the *Actions to be Performed* screen. NetWare replaces track zero information and reloads file server utilities, if necessary.

■ ENABLE OR DISABLE DISK MIRRORING OR DUPLEXING

If disk mirroring or duplexing is enabled (during installation or with maintenance options), NetWare automatically stores a copy of the disk on a second hard disk (on the same channel if the disks are mirrored; on a different channel if the disks are duplexed). Both disks work in tandem, constantly storing and updating the same files. If one disk fails, the other usually continues to operate, unless the disk channel fails.

If a mirrored or duplexed disk fails, a warning message appears. Unmirror the disk drives and bring down the file server. Replace the hard disk (p 130) and restore mirroring or duplexing as soon as possible.

Unmirror disk drives

When you temporarily unmirror (or shut down) one of the drives in a mirrored pair, the other drive continues to function normally under Hot Fix, but is no longer protected by mirroring or duplexing.

To shut down a drive and turn off its mirroring feature, type at the file server console

UNMIRROR ***nn***

Replace ***nn*** with the number of the disk drive that is to be shut down and unmirrored.

✓ *Type* **DISK** at the file server console *to determine the number of the failed drive. The "stat" column lists any failed drive as D-xx (D means "dead"; the number after D identifies the other drive in the previously mirrored pair).*

Remirror disk drives

To restore mirroring or duplexing protection to a pair of disk drives after one has failed or been unmirrored temporarily, type the following at the file server console.

REMIRROR ***nn***

Replace ***nn*** with the number of the disk drive that failed or was unmirrored.

✓ *Type* **DISK** at the file server console *to determine the number of the failed drive. The "stat" column lists any failed drive as D-xx (D means "dead"; the number after D identifies the other drive in the previously mirrored pair).*

Mirroring is restored and data on the functional drive is copied to the drive specified.

■ MODIFY A DISK'S HOT FIX SIZE

Only experienced installers should perform this task since it poses considerable risk to your network.

When areas of a disk become damaged so that they won't store data reliably, a NetWare feature called Hot Fix redirects data to a reliable block in a "Hot Fix Redirection Area." By default, NetWare reserves 2% of the disk for this area.

This percentage can be changed indirectly by changing the percentage of the disk used for "logical" storage. The difference between the actual (physical) size of the disk and the logical size you specify is automatically allocated to Hot Fix.

Use FCONSOLE to periodically monitor Hot Fix statistics (p 114). If most of the allocated Hot Fix space is being used, a disk may be failing. Replace or repair the disk or decrease its logical size (see the instructions below) to allocate more area to Hot Fix.

1. Back up all data before beginning. Changing the logical size of the disk destroys data on the hard disk in question.
2. Down the file server, boot DOS v3.0 or above, and insert the *SYSTEM-1* diskette into drive A.
3. At the file server console, type

   INSTALL -F

4. The *File Server Definition* screen appears
5. Scroll to the *Hard Disk Information* section of the form and select the *Logical size* field under the disk whose redirection area you are changing.

   A message appears indicating that data will be destroyed.
6. If this is not a problem, select No when you are asked whether you want to save the disk.
7. Type the new value and press <Enter>.
8. Adjust *Volume size* fields as necessary.
9. Save the changes and exit the form by pressing <F10>.
10. Press <F10> to confirm the items on the *Actions to be Performed* screen. NetWare regenerates operating system and file server utilities. (Or press Alt-<F10> to abort the program.)

■ REPAIR MINOR HARD DISK PROBLEMS

Run VREPAIR to correct minor hard disk and volume problems without destroying data on the disk. For major problems (disk reads and writes can't be completed) see COMPSURF in *Using the Network*.

Use VREPAIR in these situations:

- Hardware failure causes disk read errors or prevents volumes from mounting.
- Power failure corrupts a volume.
- Server or workstations display Read, Write, Fatal DIR, FAT table, and Mirror mismatch error messages.

VREPAIR compares primary File Allocation and Directory Tables with their mirrored counterparts and selects and writes the more nearly correct entry to both tables.

1. As a precaution, back up all data on the disk.
2. Down the server and boot DOS v3.0 or above; insert the *SYSTEM-2* diskette into drive A and type

   VREPAIR
3. Follow screen prompts to select the drive and volume that need to be repaired.
4. Specify VREPAIR parameters:
   - Print an error report (a printer must be connected to the network as printer 0)
   - Test for bad blocks
   - Recover "lost" blocks (a block not identified in the FAT as part of a file)
5. Confirm the parameters and run VREPAIR. As VREPAIR runs, any errors it finds are displayed on the screen. Abort the current series of error reports by typing Yes when prompted. Type No to continue.
6. When the tests are complete, you are prompted to make VREPAIR's corrections permanent. If you select Yes, VREPAIR updates the volume.
7. When the corrections have been made, do one of the following:
   — Run VREPAIR on another volume. Press <Enter> and select the new volume.
   — Exit. Press <Enter> to return to the volume selection prompt. Press <Enter> twice. Turn the file server off and then on to restart the server.

■ VIEW VOLUME INFORMATION

Several NetWare utilities track volume information.

With VOLINFO. Use VOLINFO to view the following volume information on any server on your network:

- Name
- Size of volume (in KB or MB)*
- Disk space (in KB or MB)* being used
- Disk space (in KB or MB)* available for use
- Number of directory entries allocated to the volume
- Number of directories that can still be created

*Press <F2> to toggle between KB and MB.

✓ *Figures on the display flash if disk space reaches minimum or maximum levels.*

To access volume information, type

VOLINFO

With DISK. Use DISK to view the following information about volumes:

- Drive and drive type volume is on
- I/O errors
- Redirection blocks available
- Redirection blocks used
- Drive numbers of mirrored drives
- Other volumes sharing the drive

At the file server console type

DISK *VolumeName*

With CHKVOL. Use CHKVOL to view the following information:

- Disk space available on volume
- Disk space being used

Type

CHKVOL [*DirectoryPath*]

Include a directory path to view information about any volume on any file server.

■ CHANGE A VOLUME DEFINITION

A volume is defined by several parameters: size, name, number of directory entries, and whether directories will be cached. Changing the number or size of volumes is more complicated than changing other parameters because previously defined volumes and any data stored on them are destroyed.

Preliminary steps

1. **Back up all data** before beginning, particularly if you are changing the number or size of volumes or reducing the number of directory entries.

   Changing these parameters destroys data. Although changing other volume para- meters doesn't destroy data, we recommend backing up your files.
2. Down the file server and boot DOS v3.0 and above; insert the *SYSTEM-1* diskette into drive A.
3. At the file server console, type

   INSTALL -F

   The *File Server Definition* screen appears.
4. Scroll to the *Volume Information* section and refer to the appropriate instructions below.

Change the volume name.

1. Highlight the *Volume name* field for the volume definition you are modifying.
2. Type the new name.

   The name of the system disk (SYS) can't be changed or used for any other volume. For other volumes, consider these guidelines.

Volume Name Parameters	
Length	2 - 15 characters
Invalid characters	Initial periods; spaces

Change the number or size of volumes (Con't. from previous page).

✓ *Changing the number or size of volumes destroys data.*

1. Select the *Volume size* field for the volume definition you are modifying.

   A message appears indicating that all data on the disk will be destroyed.

2. If data loss is not a problem, select No when you are asked whether you want to save the disk.
3. Type the volume size (in MB); press <Enter>.

   If you specify less than the disk's full capacity, NetWare creates a default volume and allocates unassigned disk space to it.

✓ *The SYS volume must contain at least 10 megabytes (MB). All disk space must be assigned (either to volumes you create or to the default volume). The total of the volume sizes must equal (but cannot exceed) the disk's full storage capacity.*

4. Repeat this procedure to create other volumes or redistribute disk space.

Change the number of directory entries.

✓ *Decreasing the number of directory entries destroys data.*

This parameter controls how many directories and files can be created within a volume. The server uses this information to keep track of a file's location and other file-related properties.

For example, directory names, filenames, and trustee lists each take up one or more directory entries. Since a directory entry is always 32 bytes, each block (4,096 bytes) can hold 128 directory entries.)

NetWare automatically calculates the number of directory entries for you based on the size of the directory (4 blocks, plus an additional block for every 2MB in the volume, times 128 entries per block). The default is usually sufficient, but can be changed.

You must balance the number of directory entries against available memory, especially if a limited amount of memory is available

in the server and you plan to cache the volume's directories (see below). All entries are rounded up to the nearest multiple of 128.

To change the number of directory entries, type the new value in the field and press <Enter>.

Cache volume directories

1. Type Y or N and press <Enter>.

   When a volume's directory is cached, a copy of the directory is written to a buffer in the file server's memory (instead of being written to the hard disk), thus allowing directory searches to be performed more quickly. While caching directories speeds up access, caching also consumes a significant amount of memory.

Save the changes

1. Repeat the above procedures for other volumes, as necessary.
2. When the volume information is correct, save the changes and exit the form by pressing <F10>.
3. Press <F10> to confirm the items on the *Actions to be Performed* screen. NetWare replaces track zero information and reloads file server utilities, if necessary.

Notes

■ MONITOR WORKSTATION ACTIVITY

To track the activities of workstations logged in or attached to the file server, type the following at the file server console.

MONITOR

A chart appears, in a 6-block format, listing information about the first 6 station numbers. To see stations with numbers higher than 6, include the station number in the command. For example, type

MONITOR 10

The 6-block display that includes station 10 appears.

To clear the display from the screen type

OFF

To update the display manually, retype the MONITOR command.

As users move in and out of applications and files, abbreviations for the transactions taking place flash briefly on the screen.

In addition, MONITOR tracks the following:

- Which stations are logged in.
- The last request made of the file server (requests are displayed in the area to the right of the station number).
- The five most recently opened files.
- The status of each open file. The first number in the *Stat* column is the DOS task number. The remaining status symbols include the following:

P	Other stations can't read from (if P is in the first position) or write to (if P is in third position) the file.
R	Other stations can read the file.
W	This station is writing to the file.
Pers	The file is logged but not locked.
Lock	The file is locked.
T	A transactional file is open.
H	A transactional file is on hold until the transaction is completed.

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